	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	66971	(build or built or building or construct or constructed or constructing or construction or generate or generated or generating or generation or design or designed or designing or define or defined or defining or definition or format or formatted or formatting or layout or laid or laying or template or arrange or arranged or arrangement or arranging or create or created or creating or creation or designate or designated or designating or designation or design or designed or designing or define or defined or defining or definition or customize or custom or customized or customizing or customization of personal or personalize personalizing or personalization) near5 (label or labeling or tag or sticker)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:56
2	BRS	L2	1193383	(color or palette or size or shape or style or styling or attribute or content or appearance or font or letter or lettering or alphanumeric or number or text or graphic or symbol) near5 (position or location or area or region or zone)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:57

	Type	L #	Hits	Search Text	DBs	Time Stamp
3	BRS	L3	6979	2 near5 (label or labeling or tag or sticker)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:57
4	BRS	L4	134192	(2 or 3) near5 (designate or designated or designating or designation or design or designed or designing or define or defined or defining or definition or customize or custom or customized or customizing or customization of personal or personalize personalizing or personalization or assign or assigned or assigning or assignment or select or selected or selecting or selection)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:57

	Type	L #	Hits	Search Text	DBs	Time Stamp
5	BRS	L5	1101807	(rotate or rotated or rotating or rotation or rotational or translate or translated or translating or translation or orientation or orientate or orientated or orientating or locate or located or location or location or position or positioned or positioning) near5 (color or palette or size or shape or style or styling or attribute or content or appearance or font or letter or lettering or alphanumeric or number or text or graphic or symbol or code or barcode)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:58
6	BRS	L6	7525	5 near5 (label or labeling or tag or sticker)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:58

	Type	L #	Hits	Search Text	DBs	Time Stamp
7	BRS	L7	105127	(5 or 6) near5 (designate or designated or designating or designation or design or designed or designing or define or defined or defining or definition or customize or custom or customized or customizing or customization of personal or personalize personalizing or personalization or assign or assigned or assigning or assignment or select or selected or selecting or selection)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:58
8	BRS	L8	34946	(print or printing or printed) near5 (label or labeling or tag or sticker)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:59
9	BRS	L9	617	1 and 4 and 7 and 8 Scanned Ti, Ab, Kwic all	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/05/19 14:59

	Document ID	Issue Date	Inventor	Current OR	Current XRef	Pages
1	US 4623418 A	19861118	Gombrich; Peter P. et al.	156/361	156/384; 358/1.12; 358/1.18; 400/88; D18/50; D18/52	51
2	US 4718784 A	19880112	Drisko; James E.	400/68	101/288; 101/93.04; 358/1.18; 400/63; 715/508; 715/515; 715/520	23
3	US 4939674 A	19900703	Price; Macy J. et al.	358/1.9	101/93.04; 101/93.4; 283/37; 283/81; 358/1.18; 715/507; 715/520	17
4	US 5448685 A	19950905	Ogura; Wataru et al.	358/1.18	358/1.2; 358/1.9; 715/508	89
5	US 5544287 A	19960806	Roth; Mark W.	358/1.15	358/1.1	34
6	US 5559934 A	19960924	Ogura; Wataru et al.	358/1.18	358/1.11; 400/61; 400/83	81
7	US 5621864 A	19970415	Benade; Daniel A. et al.	358/1.18	715/500	25

L9 results

	Document ID	Issue Date	Inventor	Current OR	Current XRef	Pages
8	US 6056195 A	20000502	Spain; Wanda Hudgins	235/432	235/487; 235/494; 358/1.18	10
9	US 6085126 A	20000704	Mellgren, III; Edmund M. et al.	700/233	700/232; 715/506	34
10	US 6428640 B1	20020806	Stevens; Timothy A. et al.	156/64	156/215; 156/DIG.6; 283/98	9

L9 results

US-PAT-NO: 4623418
DOCUMENT-IDENTIFIER: US 4623418 A
TITLE: Electronic hand held tape labeler
DATE-ISSUED: November 18, 1986
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Gombrich; Peter P.	Minneapolis	MN	N/A	N/A
Uttermark; John A.	White Bear Lake	MN	N/A	N/A
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US-CL-CURRENT: 156/361, 156/384 , 358/1.12 , 358/1.18 , 400/88 , D18/50 , D18/52

ABSTRACT: There is disclosed a hand held labeler apparatus (40) utilizing an X-Y plotter apparatus (71) for printing on label material (60) rotatably supported as a label supply roll (58). The labeler apparatus (40) includes a keyboard (62) for entering label information to be printed on the label, such as alpha/numeric characters and special symbols and operational information for control of the labeler apparatus. Further, a liquid crystal display (66) is provided facing generally toward the user when the labeler apparatus (40) is hand held such that the liquid crystal display (66) is readily observable as the label information is entered at the keyboard (62).
19 Claims, 47 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 40

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Abstract Text - ABTX (1): There is disclosed a hand held labeler apparatus (40) utilizing an X-Y plotter apparatus (71) for printing on label material (60) rotatably supported as a label supply roll (58). The labeler apparatus (40) includes a keyboard (62) for entering label information to be printed on the label, such as alpha/numeric characters and special symbols and operational information for control of the labeler apparatus. Further, a liquid crystal display (66) is provided facing generally toward the user when the labeler apparatus (40) is hand held such that the liquid crystal display (66) is readily observable as the label information is entered at the keyboard (62).

US Patent No. - PN (1): 4623418

Brief Summary Text - BSTX (3): Labeler devices have long been used to make self-adhesive strips of labels with appropriate indicia thereon. The self-adhesive strips of labels are then attached to objects for various purposes such as identification of the objects. However, a typical drawback with existing labelers is their relative bulkiness which limits their portability. Additionally, another problem with currently existing labelers is their severely limited ability to provide labels of various sizes/orientation of characters. Some attempts have been made at developing a hand held labeler as is evident by U.S. Pat. No. 4,407,692. However, this patent exhibits several

disadvantages. For example, thermographic printing elements are employed, requiring the use of special thermal paper. In addition, heat dissipation and packaging are a problem. Also, a thermographic printer device cannot change the color of the label print. Further, the display does not appear to be positioned such that the operator can readily observe the entries being made at the keyboard. The power requirements would also appear fairly substantial. In addition to these and many other problems, the hand held labeler disclosed in U.S. Pat. No. 4,407,692 appears relatively complicated and indeed, it is difficult for the applicant to appreciate how the labeler disclosed in U.S. Pat. No. 4,407,692 will even function as disclosed.

Brief Summary Text - BSTX (6): The present invention relates to a hand held labeler apparatus, including a housing having a front end portion and a back end portion, the housing further having a top portion, side portions and a bottom portion. The bottom portion and side portions are adapted for being engaged by a user's hand. The labeler further includes label support means interconnected to and supported by the housing for supporting a composite web of label material releasably adhered to a backing strip of material, the composite web having a longitudinal axis and a transverse axis. Power supply means is positioned within and supported by the housing for providing the electrical energy required to operate the labeler apparatus. Printing means is supported by the housing for printing on the label material at a printing position. The printing means includes an X-Y plotter apparatus electrically interconnected to the power supply means. The X-Y plotter apparatus includes a marker means for applying indicia on the label material, the indicia being applied at the printing position. The X-Y plotter includes Y-motor means for advancing the composite web in a direction parallel to the longitudinal axis of the composite web and toward the printing position into printing relationship with the printing means, the X-Y plotter further including X-motor means for movement of the marking means across the composite web parallel to the transverse axis thereof. Keyboard means is supported on the top portion of the housing for entering user-selected label information to be printed on the label material by the printing means and for entering operational information for controlling operation of the keyboard means and the printing means. Display means supported by the housing is provided for displaying the selected information to be printed by the printer means. Control processor means is supported by the housing and electrically interconnected to the keyboard means for receiving and processing data representative of the selected label information and operational information entered at the keyboard means. The control processor means is electrically interconnected to the display means for transmitting to the display means data representative of the selected label information to be displayed at the display means. The control processor is further electrically interconnected to the printing means for transmitting to the printing means data representative of the selected label information to be printed on the label material by the printer means. The control processor means is further electrically interconnected to the X-Y plotter for advancing the label material as required for printing.

Brief Summary Text - BSTX (10): Yet another advantage of the present invention is the provision for varying sizes (lengths) of labels to be selected by the user, the control

means processor determining the available label printing area based on the user selected label size.

Brief Summary Text - BSTX (11): Still another advantage of the present invention is its capability to print multiple lines of information on a single label.

Brief Summary Text - BSTX (12): Further, the drive mechanism of the present invention has slight power requirements as compared to other drive mechanisms and is relatively efficient. In one embodiment of the present invention, the control processor means will adjust the size of the label print depending on the length of the label selected.

Brief Summary Text - BSTX (14): Still another advantage of the present invention is the presence of a display means. In one embodiment display means is provided for displaying the information to be printed thereby enabling the user to review the displayed information to make sure it is correct and make any necessary changes and/or modifications before initiating the printing of the label. This is particularly advantageous in that the user can modify the information so displayed prior to printing to make sure of its accuracy.

Brief Summary Text - BSTX (21): The present invention provides a labeler apparatus with substantial flexibility and ease of use. The present invention can be utilized for labeling a wide variety of items of various sizes and configurations and for printing a variety of information on labels of different sizes. For example, the present invention can be utilized to print labels for use on relatively small diameter wire leads as well as large containers, etc.

Detailed Description Text - DETX (2): Referring now to the drawings, there is illustrated in FIGS. 1 and 2 a preferred embodiment of the present invention generally being designated by the reference numeral 40. As illustrated, the labeler apparatus 40 of the present invention is a portable, hand held alpha/numeric and symbol labeler apparatus for printing on labels. The labeler apparatus includes a housing 42 adapted to fit in a user's hand and having a front and back end 44, 46, two sides 48, 50, a bottom surface 52 and a top surface 54. Brackets 56 are mounted to the front end 44 of the housing for rotatably supporting a label supply roll 58 comprising a composite web having label material 60 releasably adhered to a backing strip material 59. In the embodiment shown, there are multiple distinct strips of label material 60a, b, c, although it will be appreciated that there may be only a single strip of label material present. Once printed, in the embodiment shown, the lable is separated from the remainder of the supply roll 58 by use of a serrated cutting edge 63 on the labeler apparatus 40 and removed by peeling the label material 60 off the backing material 59. The self-adhesive labels may then be applied to the object for which intended. It will be appreciated that in alternate embodiments, discrete labels having a fixed length and width might be used thereby not requiring cutting of the label material by a serrated cutting edge. Further, different label stocks might be used to provide labels having different lengths and widths.

Detailed Description Text - DETX (3): The labeler apparatus 40 includes a keyboard or keypad 62 disposed on the top surface 54 of the housing 42 including twenty one keys 64 utilized for entering label information to be printed on the labels such as alpha/numerics and special symbols and for entering operational information for controlling operation of the labeler. A sixteen character by one line liquid crystal display (LCD) 66 is provided for viewing the data to be printed on the label material 60. The LCD display is disposed adjacent the keyboard 62 and is shown facing upwardly and rearwardly toward the user and the keyboard 62 so as to be visible during use. As illustrated in FIG. 2, and more particularly in FIGS. 3A-B, the labeler apparatus 40 includes a printing mechanism 70 which utilizes an X-Y plotter apparatus 71 including an ink pen cartridge 72 which is removable from the printing mechanism 70. The printer mechanism 70 is controlled by two stepping motors; one for horizontal movement of the ink pen cartridge or printer head 72, generally referred to as the X-stepper motor and generally designated by numeral 74 in FIG. 3A, and one for the movement of the label material 60, generally referred to as the Y-stepper motor and generally designated by the reference numeral 76 in FIG. 3A. Accordingly, the X-stepper motor 74 controls movement of the printer head across or transversely of the label material 60 while the Y-stepper motor 76 controls movement of the label material 60 in a direction generally along its longitudinal axis. It will be appreciated that many different X-Y plotter apparatus might be utilized. However, the applicant has found that the Alps Electric Co. Model DPG 11 printer by Alps Electric, Inc., 100 North Centre Avenue, Rockville Centre, New York, NY 11570 is adaptable for this application.

Detailed Description Text - DETX (11): Plotting characters and symbols is accomplished by electronically stepping the X and Y stepper motors 74, 76 in the appropriate direction depending on a character/symbol algorithm generated by a programmed control microprocessor. The ink pen cartridge 72 is moved on and off the label material 60 by a solenoid 99 actuated mechanism under control of the microprocessor. The ink pen cartridge 72 is provided with a plottable area on the label material 60 which in the preferred embodiment shown is defined as 48 millimeter (mm), or 240 steps, along the transverse axis of the label material 60 which has a width of 58 mm and programmable as desired along the longitudinal axis of the label material 60. It will be appreciated that the plottable area may vary depending on the width of the label material 60 being used. Accordingly, any character/symbol may be generated in this manner according to an alpha/numeric character and symbol algorithm stored in the microprocessor memory. Each step length is 0.2 mm for both the X and Y-stepper motors 74, 76. The stepper motors in the embodiment illustrated have a rate of 260 steps per second. Either one or both of the stepper motors might be activated during the stepping process. The smallest character/symbol that can be printed is 1.05 mm wide.times.1.45 mm high. The largest character/symbol that can be printed is 48 mm wide.times.200 mm high. A character/symbol may be printed having any multiple dimension of the 0.2 mm step resolution according to the program stored in the control microprocessor memory. In the embodiment shown, the printing speed of the printer mechanism is 12 characters per second.

Detailed Description Text - DETX (14): As illustrated in FIG. 5 a twenty one key keyboard 62 is used in entering printing commands and character data to be printed on the label material 60. Since more than twenty one alpha/numerics and commands are required for key entry, in the embodiment shown, multiple keystrokes are required to select alpha data and special functions. One position; two position and three position keys are used for key entry. Two one position keys having indicia SHIFT thereon enable selection of character data and functions as indicated by indicia on the top or upper portion of the remaining keys 64. In the preferred embodiment, one of the SHIFT keys will be blue and the other red. The blue SHIFT key selects the upper position function of the two position keys and the upper left function of the three position keys, while the red SHIFT key selects the upper right function of the three position keys. Depressing the blue or red SHIFT key and then the appropriate key 64 enters the representative code into the display as indicated by the indicia in the upper left or upper right, respectively. The lower position functions of the two and three position keys are activated by directly pressing the keys. The indicia representing the lower position functions will preferably be in black so as to indicate the primary key function while the upper position functions of the two position keys and the upper left position functions of the three position keys will be represented by blue indicia to indicate use with the blue SHIFT key and the upper right position function of the three position keys will be represented by red indicia to indicate use with the red SHIFT key. Thus any key lettering in black is a primary entry and any key lettering in red or blue is a secondary entry and can be activated by pressing the corresponding red or blue SHIFT key followed by the desired key. It will be appreciated that the keyboard shown is only one example of a possible configuration. Other configurations are possible, including those which provide for foreign language entry, and other functions such as a graphics mode, printing logos, etc. As illustrated in FIG. 2 a keyboard substrate 84 is positioned beneath the keys 64 of the keyboard 62.

Detailed Description Text - DETX (18): In operation, the unit is turned on by depressing the ON/OFF key. After three minutes, the unit will shut itself off when no entries are made. When turned back on, the labeler will initialize to the default conditions. Normally, the labeler apparatus 40 will be in numeric entry mode such that key entries made without depressing first one of the SHIFT keys will result in a numeric entry or a function as designated on the bottom portion of the keys 64. To select a label size, the operator will enter a code number as it relates to the size of the label desired, the control processor of the labeler apparatus including a table of values correlating the entered code number to a specific label length. The code number for each label size or length is predetermined and might be found on the bottom surface 52 of the labeler along with complete instructions for operation. The control processor of the labeler apparatus will derive not only the label length from the code entry but also the maximum size of lettering that can be printed in accordance with that size label. After entering the number representative of the desired label size, the user presses the LABEL key. When the LABEL key is depressed, the control processor recognizes the code number as being representative of the desired label size.

Detailed Description Text - DETX (22): The labeler apparatus 40 may be utilized as a sequential number printing device, the first number is entered followed by the LO key and then the last number in the sequence followed by the HI key. The SEQ key is then pressed and the sequence of labels is printed.

Detailed Description Text - DETX (23): Alpha/numeric characters previously entered and displayed at the LCD display 66 can be printed 90 degrees from the normal printed line which is transverse to the longitudinal axis by pressing the ROT key and then the PRINT key. The ROT key causes alpha/numeric characters previously entered and displayed to be rotated 90 degrees when printed on the label material 60. The labeler apparatus 40 will automatically size the number of characters entered to the size of the label previously programmed into the control processor by the user. Restrictions on the number of characters versus size of the label might be indicated by instructions on the back side of the labeler apparatus 40.

Detailed Description Text - DETX (48): (3) If the LABEL key was pressed, the character string in the display is compared to valid label configurations. If there is not a match between the string and the valid configurations, an error is displayed, else the selected label is flagged and the printer is configured to label size, character size, and character orientation.

Detailed Description Text - DETX (54): FIGS. 13A through 13B illustrate the two row (TOROW) subroutine. The two row subroutine performs much the same as the PRNT SUBROUTINE, except top row and bottom row start of string is added in place of a print start of string, thus allowing for two rows of alpha/numeric strings to be printed on one label.

Detailed Description Paragraph Table - DETL (2):

KEY	FUNCTION
##STR1##	Turns Labeler ON and OFF and vice versa. Also provides a reset to the default con- ditions programmed in ROM.
##STR2##	Rotate (ROT) enables characters previously entered into the display to be rotated 90 degrees and printed on the label. A vertical line appearing on the LCD to the left of the character string indicates that the character string will be rotated when it is printed. A greater than symbol ">" appearing on the LCD to the left of the character string indicates that the character string will not be rotated when printed. To cancel the rotation of the character string, the ROT key is pressed a second time. # sets the number of labels to be printed upon a "PRINT" command or during a "SEQ" function. This command provides for multiple labels to be printed with the contents of the LCD. The default value is 1. The number of labels printed can be changed by entering the appropriate number and pressing the # key.
##STR3##	LO - enters the lower value character string for the sequence function. The character string can consist of both alpha and numeric characters as long as the alpha is a prefix. The default value is 0. HI - enters the higher value character string for the sequence function. The character string can consist of both alpha and numeric characters as long as the alpha is a prefix. The default value is 0. SEQ - enables the Labeler to automatically print labels sequentially

from the character string entered by the "LO" key. Alpha characters are printed as entered and are not incremented. Once a sequence is completed, the LO and HI values will default to 0. The CE key can cancel a sequence function. ##STR4## ALT - displays the contents of the alternate (or second) row. The Labeler can print two rows at a time. Each row can be viewed on the LCD by alternately pressing the "ALT" key. The LCD also contains the row number that is being displayed in the leftmost position followed by a vertical line indicating rotation or a greater than symbol indicating non-rotation. The contents of both rows will be printed when depressing the "PRINT" key. If the contents of the second row is not to be printed, it must be displayed and cleared. A row can be cleared by pressing the CE key. The Labeler will not print a null character _____ string.

Detailed Description Paragraph Table - DETL (3): _____ xx . . . . . x xx . . . . . . x LABEL - enables entry of label code number. This sets up the Labeler printing format to correspond with the label stock being used. This key will set the following: (1) The number of characters printed per line sized to the label stock. (2) The distance between labels that the Labeler must advance. (3) Whether 1 or 2 lines of printing are allowed. (4) The correct position of the character string on the label. (5) The number of labels between advance. ##STR5## ADV - causes the Labeler to advance the label stock to a preset distance of 1 mm. PRINT - causes the Labeler to print the character string that is displayed in the LCD. The Labeler will also advance the label stock upon completing a row of labels. Printing will always begin with the leftmost label and move in the right hand direction. The character string will be printed left hand justified on the label. Whenever the LCD is cleared, depressing this key will cause the printer to "home". ##STR6## A,B - enters alpha A,B into the display with SHIFT keys. 1 - enters numeric 1 into display. ##STR7## C,D - enters alpha C,D into the display with SHIFT keys. 2 - enters numeric 2 into display. ##STR8## E,F - enters alpha E,F into the display with SHIFT keys. 3 - enters numeric 3 into display. ##STR9## G,H - enters alpha G,H into the display with SHIFT keys. / - enters slash into display. ##STR10## I,J - enters alpha I,J into the display with SHIFT keys. 4 - enters numeric 4 into display. ##STR11## K,L - enters alpha K,L into the display with SHIFT keys. 5 - enters numeric 5 into display. ##STR12## M,N - enters alpha M,N into the display with SHIFT keys. 6 - enters the numeric 6 into display. ##STR13## O,P - enters alpha O,P into the display with SHIFT keys. BS - causes the previously entered character to be erased in the display. ##STR14## Q,R - enters alpha Q,R into the display with SHIFT keys. 7 - enters the numeric 7 into display. ##STR15## S,T - enters alpha S,T into the display with SHIFT keys. 8 - enters numeric 8 into display. ##STR16## U,V - enters alpha U,V into the display with SHIFT keys. 9 - enters numeric 9 into display. ##STR17## W,X - enters alpha W,X into the display with SHIFT keys. SPACE - enters a blank into the display. ##STR18## SHIFT (Blue) - enables entry of charac- ters and functions identified in Blue. ##STR19## Y,Z - enters alpha Y,Z into the display with SHIFT keys. 0 - enters the numeric 0 into display. ##STR20## SHIFT (Red) - enables entry of charac- ters and functions identified in Red. ##STR21## enters the characters +,- into the display with SHIFT keys. CE clears the contents of the display.

Claims Text - CLTX (5): d. printer means supported by the housing for printing on the label material at a printing position, the printer means including an X-Y plotter apparatus electrically interconnected to the power supply means, the X-Y plotter apparatus including marking means for applying indicia on the label material, the indicia being applied at the printing position on a side of the label material facing the user;

Claims Text - CLTX (7): f. keyboard supported on the top portion of the housing for entering user-selected label information to be printed on the label material by the printer means and for entering operational information for controlling operation of the keyboard and the printer means;

Claims Text - CLTX (9): h. control processor means supported by the housing and electronically interconnected to the keyboard for receiving and processing data representative of the user selected label information and operational information entered at the keyboard, the control means being electrically interconnected to the display means for transmitting to the display means data representative of the selected information to be displayed at the display means, the control means being further electrically interconnected to the printer means for transmitting to the printer means data representative of the user selected label information to be printed on the label material by the printer means, the control processor means being further electrically interconnected to the drive means for advancing the label material as required for printing.

Claims Text - CLTX (12): 4. A labeler apparatus in accordance with claim 1, wherein the label material includes distinct strips of label material mounted transversely of the longitudinal axis of the composite web, the control processor means providing for operator selection of the distinct strip of label material to be printed on.

Claims Text - CLTX (19): 11. A labeler apparatus in accordance with claim 1, wherein the control processor means and the printer means cooperate to print the selected information on the label material in one of first and second directions, the first direction being substantially parallel to the longitudinal axis of the composite web, the second direction being substantially parallel to the transverse axis of the composite web, the control processor means and the keyboard cooperating to enable user selection of the first and second direction.

Claims Text - CLTX (22): 14. A labeler apparatus in accordance with claim 1, wherein the control processor means and the printer means cooperate to provide for printing of multiple modes of selected information on the label material, the control processor means and the keyboard means cooperating to enable user selection of the number of rows to be printed.

Claims Text - CLTX (25): 17. A labeler apparatus in accordance with claim 1, wherein the control processor means operates with the display means to display the user selected

information entered at the keyboard prior to printing of the same on the label material, the control processor means cooperating with the keyboard to enable user activated printing of the selected information so displayed.

Claims Text - CLTX (31): d. printer means supported by the housing for printing on the label material at a printing position proximate the front end portion of the housing, the printer means printing on a side of the label material facing the back end portion of the housing so as to be observable by the user when the housing is hand held by the user, the printer means including an X-Y plotter apparatus electrically interconnected to the power supply, the X-Y plotter apparatus including a marker apparatus for marking on the label material, the X-Y plotter apparatus further including Y stepper motor means for incrementally advancing the label material in a direction substantially parallel to the longitudinal axis of the label material and X stepper motor means for incremental movement of the marker apparatus in a direction parallel to the transverse axis of the label material;

Claims Text - CLTX (32): e. a keyboard supported on the top portion of the housing for entering user selected label information to be printed on the label material by the printer means and for entering operational information controlling operation of the keyboard and the printer means, the keyboard including multiple function keys having multiple modes of entry, each mode of entry providing for entry of different information, the modes of entry being user selectable by use of mode selection keys on the keyboard;

Claims Text - CLTX (33): f. display means supported on the top portion of the housing intermediate the keyboard and the printing position for displaying user selected label information to be printed by the printer means, the display means facing upwardly and toward the back end portion when the housing is hand held by the operator, thereby enabling the operator to observe the display means when entering the use selected label information at the keyboard; and

Claims Text - CLTX (34): g. programmed control processor means positioned in the housing and electrically interconnected to the power supply, the keyboard, the printer means, and the display means, the control processor means receiving and processing data received from the keyboard means which is representative of the selected label information and operational information entered at the keyboard, the control means transmitting to the display means data representative of the selected label information to be displayed at the display means, control means transmitting to the printer means data representative of the selected label information to be printed on the label material by the printer means.

US-PAT-NO: 4718784
DOCUMENT-IDENTIFIER: US 4718784 A
TITLE: Rating plate printing apparatus and method
DATE-ISSUED: January 12, 1988
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Drisko; James E.	Santa Rosa	CA	N/A	N/A

US-CL-CURRENT: 400/68, 101/288 , 101/93.04 , 358/1.18 , 400/63 , 715/508 , 715/515 , 715/520

ABSTRACT: Printing apparatus and method for printing label designs on blank labels, where the blank labels are organized in rows of one or more labels per row. The apparatus includes a dot matrix impact printer with a resolution of at least 100 pixels per inch. The printer has both a text and a graphics printing mode of operation. A computer used to control the printing process stores label designs and graphic images in its memory. Each label design specifies one or more text strings,their position in the label, and one or more graphic images, and their position in the label. Text and graphic images can be positioned side by side.

The user specifies the identity and quantity of labels to be printed, the order in which to print the labels, and the number of blank labels there are in each row of labels to be printed. Each label contains a multiplicity of lines to be printed. The printing process proceeds by positioning the printer at the beginning of a row of blank labels. The computer then generates a list of the label designs to printed on the current row of blank labels. For each such line to be printed, the computer generates a list of the text strings and graphic images to be printed, along with information on where each item is to be printed. For each graphic image on this line, the computer selects the portion of the graphic image to be printed on the current line. Then the computer sends the printer commands to print the items in the list in accordance with the positioning information in the list, including sending commands to print the text strings in text mode and the graphic images in graphics mode.

10 Claims, 13 Drawing figures
Exemplary Claim Number: 4
Number of Drawing Sheets: 12

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Abstract Text - ABTX (1): Printing apparatus and method for printing label designs on blank labels, where the blank labels are organized in rows of one or more labels per row. The apparatus includes a dot matrix impact printer with a resolution of at least 100 pixels per inch. The printer has both a text and a graphics printing mode of operation. A computer used to control the printing process stores label designs and graphic images in its memory. Each label design specifies one or more text strings,their position in the label, and one or more graphic images, and their position in the label. Text and graphic images can be positioned side by side.

Abstract Text - ABTX (2): The user specifies the identity and quantity of labels to be printed, the order in which to print the labels, and the number of blank labels there are in each row of labels to be printed. Each label contains a multiplicity of lines to be printed. The printing process proceeds by positioning the printer at the beginning of a row of blank labels. The computer then generates a list of the label designs to printed on the current row of blank labels. For each such line to be printed, the computer generates a list of the text strings and graphic images to be printed, along with information on where each item is to be printed. For each graphic image on this line, the computer selects the portion of the graphic image to be printed on the current line. Then the computer sends the printer commands to print the items in the list in accordance with the positioning information in the list, including sending commands to print the text strings in text mode and the graphic images in graphics mode.

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Brief Summary Text - BSTX (1): The present invention relates generally to the printing of labels including both text and graphics, and particularly to a system for printing rows of high resolution labels wherein each of the labels in each row can be selected from a set of different labels in accordance with a specified printing pattern.

Brief Summary Text - BSTX (4): Until recently, such plates were generally printed exclusively by professional printers in print shops. Due to the relatively high cost of setting up printing plates and the associated tooling, compared with the cost of printing each additional label, the cost per plate of printing rating plates this way is quite high unless a large quantity of labels (e.g., at least 10,000) is printed. The present invention virtually eliminates the cost of setting up a plate or label and thereby substantially reduces the cost of printing small quantities of rating plates and similar labels.

Brief Summary Text - BSTX (5): With the growing use of microcomputers and personal computers, there have been a number of programs written for printing labels using these machines. Generally, these programs have printed only text on labels, such as a set of addresses stored in a data base.

Brief Summary Text - BSTX (6): Other products, such as the MacIntosh computer made by Apple Computer include work processing programs that can combine text and graphics. While the documents created by such a product could be printed on labels, these products do not have a number of features which are important for a versatile label maker:

Brief Summary Text - BSTX (8): (2) means for printing a series of different label designs on each row of labels,

Brief Summary Text - BSTX (9): (3) means printing several different labels in an interleaved pattern, and for updating a different serial number for each one,

Brief Summary Text - BSTX (16): The need to accommodate conventional label designs and the small size of most rating plates make it important to be able to print both graphics and text side by side. At the same time, it is important to be able to print labels reasonably quickly. The problem here is that impact printers are generally much slower when printing graphics than when printing text. Therefore converting the entire label into a grapics image is not an acceptable solution, because it would make printing too slow. On the other hand, switching back and forth between graphics and text printing modes presents a number of other problems which are described, along with their solution, below.

Brief Summary Text - BSTX (17): Another feature, the ability to interleave the printing of different label designs, is important because many products need more than one rating plate or label. The present invention allows this feature to be fully exploited by providing a plurality of different print ordering patterns, and by allowing the different label designs being printed on the same line of blank labels to use the same and/or different graphics at the same or different vertical printing positions.

Brief Summary Text - BSTX (20): It is therefore a primary object of the present invention to provide an improved label printing apparatus and method that permits the design and printing of rating plates and other labels with a varity of features including the printing of text and high resolution graphics side by side, and interleaved printing of different labels.

Brief Summary Text - BSTX (22): In summary, the present invention is a printing apparatus and method for printing label designs on blank labels, where the blank labels are organized in rows of one or more labels per row. The apparatus includes a dot matrix impact printer with a resolution of at least 100 pixels per inch. The printer has both a text and a graphics printing mode of operation. A computer used to control the printing process stores label designs and graphic images in its memory. Each label design can specify one or more text strings, their position in the label, and one or more graphic images, and their position in the label. Text and graphic images can be positioned side by side.

Brief Summary Text - BSTX (23): The user specifies the identity and quantity of labels to be printed, and the order in which to print the labels. Each label can contain a multiplicity of lines to be printed. The printing process proceeds by positioning the printer at the beginning of a row of blank labels. The computer then generates a list of the label designs to printed on the current row of blank labels. For each such line to be printed, the computer generates a list of the text strings and graphic images to be printed, along with information on where each item is to be printed. For each graphic image on this line, the computer selects the portion of the graphic image to be printed on the current line. Then the computer sends the printer commands to print the items in the list in accordance with the positioning information in the list, including sending commands to print the text strings in text mode and the graphic images in graphics mode.

Drawing Description Text - DRTX (3): FIG. 1 is a block diagram of a label printing system in accordance with the present invention.

Drawing Description Text - DRTX (6): FIG. 4 depicts the display associated with an exemplary label design, FIG. 5A shows the exemplary label design when printed, and FIG. 5B shows another label design when printed.

Detailed Description Text - DETX (3): The system's central processing unit CPU 24 is a microprocessor (an Intel 8088). The software for the CPU 24 is stored in a read only memory (ROM) 26. Label design files and graphics files are stored on disk 28, but reside in nonvolatile random access memory RAM 30 when they are being printed.

Detailed Description Text - DETX (4): The CPU 24 has a keyboard 32 for receiving commands from the user, and is also used for inputting label designs. An 8 line by 42 character LCD 34 display is used to display label design files and also instructions to the user.

Detailed Description Text - DETX (8): A "label design" is the specification for a label. It defines all the element of the label: the dimensions of the label, the label's text strings, where the text strings are positioned, what size type to use, when to use bold print, and the placement of other special label features including boxes, bar code sequences, serial numbers, and graphic images.

Detailed Description Text - DETX (9): The system 20 can store a multiplicity of label designs. Each label design is stored in a separate file, called a label design file 40. For convenience the label design files are identified as LF1 to LFn where n is the number of label designs currently stored in the system 20. These files are stored on disk 28. A copy of the file, however, is stored in RAM 30 when the corresponding label designs are being modified or printed.

Detailed Description Text - DETX (10): As indicated above, each label design file specifies the dimensions of the label to be printed. Typically, labels and rating plates are printed on continuous forms 42 of blank labels 44. Usually, although not always, the blank labels 44 are organized in rows, with a plurality of labels in each row. Therefore, the design file must specify not only the size of the labels to be printed, by also the number of blank labels per row and the horizontal and vertical spacing between labels on the form 42. In the preferred embodiment, the spacing is specified in terms of the horizontal and vertical distances between the top left corners of adjacent blank labels.

Detailed Description Text - DETX (11): The format for label design files, which is discussed in more detail below, is shown in Table 1.

Detailed Description Text - DETX (12): Each graphic image which can be printed is stored in a separate graphic image file 46. When a graphic image is used in a label design, the label design references the graphic file GFx in which the image is stored.

Like the label design files, these files are stored on disk 28, and a copy is stored in RAM 30 when needed for printing. In the preferred embodiment, graphic files are generated by a separate program which translates a specified bit mapped image into a graphic image file.

Detailed Description Text - DETX (14): When the user selects a set of labels to be printed, the user specified (1) the label designs to be printed, (2) the quantity of each label design to be printed, and (3) the printing pattern, which specifies the order in which the labels are to be printed.

Detailed Description Text - DETX (15): A list of the label designs selected for printing, and the quantity of each label to be printed, is stored in a data structure called the Print Queue 48. The structure of the Print Queue 48 is shown in FIG. 3. In the Print Queue 48 the specified label designs are identified by the name of the file, LFx, in which the label design is stored.

Detailed Description Text - DETX (16): In the preferred embodiment, the user can specify one of three printing patterns: "set", "group", or "compacted group". In set mode, the labels in the print queue are printed one after another. The specified quantity of each label design to be printed is decremented as the label design is printed, and label designs are flushed from the print queue when the quantity of labels left to be printed reaches zero.

Detailed Description Text - DETX (17): In group mode, all of the labels for the first specified label design are printed before the system prints the labels for the second specified label design. Each group of labels is printed beginning on a new row of labels.

Detailed Description Text - DETX (18): Compacted group mode is the same as group mode except that when a new group labels is begun, the labels from the new group are printed starting with the first available blank label on the blank label form 42 rather than automatically indexing down to the next row of blank labels.

Detailed Description Text - DETX (19): Given the specified printing pattern, the printing process proceeds by "transferring" a representation of each label to be printed on the current row of blank labels to a data structure called the Row Queue 50. The structure of the Row Queue is shown in FIG. 3. Therefore, if the user specified that three or more label designs are to be printed in "set" mode, and there are three blank labels per row, then the Row Queue will contain a sequential list of label designs from the Print Queue.

Detailed Description Text - DETX (20): As each item is transferred from the Print Queue to the Row Queue, the following steps are taken: the quantity Qty of the label design is decremented, and three items are stored in the Row Queue: the address of the label design file, the status byte from the label design file, and the current value, if any, of the serial number associated with the label design. If there is a serial number

associated with the label design, the serial number stored in the label design file is incremented after the serial number is stored in the Row Queue 50.

Detailed Description Text - DETX (21): Once the Row Queue has been written for the current row of blank labels, the next step is to print each line within these labels. Each label will generally have a multiplicity of print lines. Furthermore, due to the vertical tabbing limitations of most printers, when a row of labels is printed, the system sequentially prints one line at a time across all of the labels in the current row before proceeding to the next line.

Detailed Description Text - DETX (22): Printing proceeds by transferring one line of printing information into a character buffer 52, and then sending the information in the character buffer 52 to the printer. During this process, the information in the label design buffers is interpreted in two steps: certain types of data are converted for printing as they are put into the character buffer 52, and other types of data are converted when sent to the printer 22.

Detailed Description Text - DETX (23): In particular, graphic image data is kept in the form of a file reference until it is time to send the graphic data to the printer 22. In the preferred embodiment, each label design can use a multiplicity of graphic images, but each graphic image can be used only once in each label design. This limitation is related to the Graph Table 54, which keeps track of what graphic data is to be printed on each line of each label design.

Detailed Description Text - DETX (24): The Graph Table 54 stores a set of integers for the labels in the current row of blank labels, with each integer representing the number of rows of pixels which have already been printed for the corresponding graphic image. Thus the Graph Table 54 is a j by m array, where j is the number of labels to be printed in the current row, and m is the number of graphic images stored in the system. When it is time to print a line of a graphic image, the system references the Graph Table 54 to determine the row position of the next band of pixels to be printed.

Detailed Description Text - DETX (26): Before describing the printing process in detail, it is necessary to understand the format of the label dsign files 40 and the label features which can be represented therein.

Detailed Description Text - DETX (27): Referring to Table 1, the Status Code specifies: (Bit 0) if the label design file is useable, (Bit 1) if text lines are to be centered, and (Bit 2) if a serial number is used in the label.

Detailed Description Text - DETX (28): In the preferred embodiment, the user can specify that text lines in a label design are to be automatically centered when printed. Lines that mix text with graphic images, or any other feature that uses graphic mode printing, cannot be centered in the preferred embodiment. Therefore these lines are printed as represented in the label design, i.e., left justified.

Detailed Description Text - DETX (30): After the serial number, the file contains a line by line specification of the label design. While the length of each line is variable, for most purposes it can be thought of as rectangular file. This orientation corresponds to the way the file is shown on the system's display 34, and is helpful when considered how multiline graphic images, boxes, and bar codes are represented. The display of an exemplary label design is shown in FIG. 4.

Detailed Description Text - DETX (31): The placement of the serial number in the label design is marked by a series of "5C" bytes. When the label is printed, these "5C" bytes are replaced with the current serial number value.

Detailed Description Text - DETX (32): The end of each line of the label design is marked by a standard ASCII carriage return code "OD".

Detailed Description Text - DETX (33): If the current date is to be printed on a label, the label design includes a "10" date code at the position where the date is to be printed. The current date is provided by the user upon system power up or reset.

Detailed Description Text - DETX (35): Two types of bar codes can be printed using the preferred embodiment: "high density 3 of 9" and "interleaved 2 of 5". The bar codes are normally written on three consecutive lines: bars which are two lines high, and human readable values on a third line below the bars. (The preferred embodiment allows the user to increase or decrease the height of the bars.) Bar code sequences are coded in the corresponding lines of the label design file as a "begin bar code" code, the sequence of values to be encoded with bar codes, and an "end bar code" code.

Detailed Description Text - DETX (37): The printer's print head can print up to 24 vertically adjacent pixels on each horizontal pass. Since there are 180 pixels per inch, each line is 30 pixels high at 6 lpi, and is 22.5 pixels high at 8 lpi. Thus, at 8 lpi it takes only one pass, printing 23 pixels (which will cause a one half pixel overlap for graphics) to print each line of the label design.

Detailed Description Text - DETX (38): The number of pins used by the printer can be changed not only from line to line, but also from character to character and even from pixel to pixel within each printed line. At 6 lpi, however, it takes two horizontal passes, each vertically separated by 15 pixels, to print one line of a label design. A additional complication is added by the fact that there is generally an interline gap between lines of text. Thus, on the first pass, text is printed using as many of the printer's pins as necessary, but on the second pass no text is printed. Note that while most text is only 20 pixels (one ninth of an inch) high, some lower case characters (sometimes called descenders) extend lower than others, and therefore as many as 24 of the printer's 24 pins are used when printing text.

Detailed Description Text - DETX (39): Since graphic images, boxes and bar codes do not have interline gaps, when the printer is in 6 lpi mode, these portions of the label must continue to be printed on the second pass for each line.

Detailed Description Text - DETX (42): Graphic images are represented by a block of codes which specify the graphic image file in which the image is stored. The number of codes used corresponds to the width and height of the graphic image, as measured in terms of the number of text characters it would take to occupy the same space. Thus if an image is six characters wide and three text lines high (rounded up), there will be a string of six graphic image codes in each of three consecutive lines in the label design file. Even if the size of the graphic image does not correspond exactly to an integer number of characters, the graphic image is given an amount of space on the printed label equal to the number of text characters coded in the label design.

Detailed Description Text - DETX (44): Boxes are special graphic images, each of which is the size of the space occupied by one "10 CPI" text character. The user can put a box, or any portion of a box, around or between any specified portion of an image by putting the proper box codes into the label design. There are eleven box graphic images: ##STR1## In the preferred embodiment, the font PROM for the printer 22 has been modified to include these box graphic images. In 6 lpi mode, the second pass is used only to print extended vertical line segments, which are defined as being the same as the vertical straight vertical line segment (so that only eleven font characters are needed even for 6 lpi mode).

Detailed Description Text - DETX (46): Example of Label Design

Detailed Description Text - DETX (47): Table 2 is a listing of a label design file. FIG. 4 shows the corresponding display which would been seen by the user setting up or reviewing the label design. FIG. 5A shows the label design when printed. FIG. 5B shows another label design when printed.

Detailed Description Text - DETX (48): Detailed Description of Label Printing Process

Detailed Description Text - DETX (49): Referring to FIG. 6, the print routine begins by clearing the print queue (box 60). The user then specifies or selects, by means of the keyboard, the label designs which he wants to print (boxes 62-64). Since all the labels printed at any one time must be printed on the same blank label form, the print routine verifies that all of the specified label designs have the same format as specified for the first selected label design.

Detailed Description Text - DETX (50): After the label designs to be printed have been selected, the user specifies the quantity of each label design to be printed, and the printing mode (box 66). At this point the process branches in one of three directions (a, b or c), depending on whether the printing mode is "set", "group" or "compacted group". Each of these branches is similar, except for the way in which the Row Queue 50 is loaded 68a-c. Once the Row Queue is loaded, one row of labels is printed (boxes 70a-c). The process of loading the Row Queue and printing the corresponding labels repeats until the Print Queue 48 is empty (boxes 72a-c).

Detailed Description Text - DETX (55): Starting with the first Row Queue slot, each slot of the Row Queue is processed as follows. First the slot is filled with the address, status and serial number of the label design file identified in slot NP of the Print Queue (box 78).

Detailed Description Text - DETX (56): Then (box 80), if the status of this label design indicates that the label design uses the serial number feature, the serial number in the label design file is incremented (so that the next time the serial number is copied into the Row Queue, the corresponding label has the next serial number). Also, the variable I is incremented and PrintQ.NP.Qty is decremented as part of the process of keeping track of how many labels of each label design have been printed.

Detailed Description Text - DETX (60): Referring to FIG. 8, the XFER GROUP routine for filling the Row Queue 50 in "group" mode is as follows. The Row Queue 50 is cleared, and the routine deermines the number of slots in the Row Queue, Q, to be filled (box 76). Q is the lesser of (a) the number of blank labels per row on the blank label form, and (b) the number of labels left to be printed for the first label design identified in the Print Queue 48.

Detailed Description Text - DETX (62): The slot filling process continues until all Q slots of the Row Queue 50 are filled (box 96). Then if all of the labels have been printed for the top item in the Print Queue (box 98), that item is removed from the Print Queue (box 100) before the routine exits.

Detailed Description Text - DETX (65): Before moving onto the next slot of the Row Queue, the process checks to see if all of the labels have been printed for the top item in the Print Queue (box 116). If so, that item is removed from the Print Queue (box 118) and the routine checks to see if the Print Queue is empty (box 120). If so, the routine exits, otherwise the routines checks to see if all the slots of the Row Queue have been filed (box 122). If not, the process continues with the next slot of the Row Queue (at box 112); if so, the process exits.

Detailed Description Text - DETX (67): After the Row Queue 50 is filled in accordance with the specified print mode, the row of labels represented by the Row Queue is printed. Referring to FIG. 10, this process begins by (box 130) positioning the printer at the beginning of a row of blank labels, zeroing the graphics table 54, and setting up two variables: L for keeping track of which line is being printed, and Last for denoting the number of lines to be printed.

Detailed Description Text - DETX (68): Then, for each line of the labels to be printed, the following steps (boxes 132-140) are repeated. First (box 132), the character buffer 52 (sometimes abbreviated as either "Char Buffer" or "CBuf") is cleared. The variable, I, used for indexing through the Row Queue is set equal to 1, and Q is set equal to the number of items in the Row Queue.

Detailed Description Text - DETX (70): This process is repeated for each line, until all the lines of the labels referenced in the Row Queue have been printed (box 140).

Detailed Description Text - DETX (74): Table 3 lists the control codes used in the Character Buffer which are different from those listed in Table 1 for use in Label Design Files.

Detailed Description Text - DETX (78): where Lsize is the width of the label, measured in pixels, and Pstn is the total length of the text in the current line (box 162). Note that autocentering is enabled (i.e., allowed) only for label designs that include only text.

Detailed Description Text - DETX (82): If the code is a new pitch code, the current pitch value is changed 176 before the process moves onto the next code in the current line of the label design file (box 178). Pstn is not incremented.

Detailed Description Text - DETX (84): If the code is a Bar, graphic image or box code, then the Pitch and Pstn need not be adjusted because, in the preferred embodiment, autocentering is disabled for label designs that use bar codes and other graphics.

Detailed Description Text - DETX (85): If the code is a serial number code, the SN flag (box 182) is set so that these codes will be replaced with the value of the current label design's serial number.

Detailed Description Text - DETX (88): Referring to FIG. 12, the process for printing the contents of the Character Buffer 52 is as follows. First (box 190) the process is initialized by clearing the print flags, setting the height of the print line in accordance with whether the label's format is 6 or 8 lpi, setting a column counter for indexing into CBuf to zero, setting a pixel position counter Pstn to zero, and setting a label counter L to 1.

Detailed Description Paragraph Table - DETL (1): TABLE 1 FORMAT FOR LABEL DESIGN FILES Byte Description 00-01 Length of entire file. 02 Status Code B0 obsolete/valid flag, 0= obsolete B1 Autocentering 1= autocenter B2 Serial number in file B3-B7 undefined 03 Label Type 00-7F Standard ROM based format 80-FF Custom Disk based format 04-07 Serial Number, double precision number 99,999,999 08-END File Data 20-5E, 60-7E Standard ASCII characters 5C S/N Place OD Line return with line feed, resets pitch to default value, must terminate each line. 10 Global Date (up to 8 ASCII char's MM/DD/YY) 90 - 9F Graphic Symbol 0 to 11 80 - 8A Box Graphic characters 04 Start/Stop Bold print 09 Start condensed 30 CPI pitch 12 Start expanded 5 CPI pitch 13 Start standard 10 CPI pitch 14 Start condensed 20 CPI pitch 16 Start C39 human readable Bar code 17 End C39 Bar code line both code & readable 18 Start C39 Bar code (last line of code) 19 Start C39 Bar code - fill in interline gap 1A Start I2/5 human readable Bar code 1B End

I2/5 code 1C Start I2/5 last line - leave gap 1D Start I2/5 - fill in interline gap

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Detailed Description Paragraph Table - DETL (2): TABLE 2 SAMPLE LABEL DESIGN FILE BYTE DATA DESCRIPTION 00 8F LSB OF FILE LENGTH 01 00 MSB OF FILE LENGTH 02 01 STATUS BYTE, ACTIVE, NO AUTO CENTER, NO S/N 03 18 FORMAT CODE 04 00 S/N - not used (see NO S/N STATUS) 05 00 S/N 06 00 S/N 07 00 S/N 08 9A GRAPHIC SYMBOL #10 09 9A GRAPHIC SYMBOL #10 0A 9A GRAPHIC SYMBOL #10 0B 9A GRAPHIC SYMBOL #10 0C 9A GRAPHIC SYMBOL #10 0D 20 SPACE 0E 09 30 CPI TEXT TO FOLLOW 0F 53 S 00 55 U 11 50 P 12 45 E 13 52 R 14 20 SPACE 15 43 C 16 4F O 17 4E N 18 44 D 19 45 E 1A 4E N 1B 53 S 1C 45 E 1D 44 D 1E 20 SPACE 1F 50 P 20 52 R 21 49 I 22 4E N 23 54 T 24 20 SPACE 25 33 3 26 30 0 27 43 C 28 50 P 29 49 I 2A 0D END OF LINE 1 2B 9A GRAPHIC SYMBOL #10 2C 9A GRAPHIC SYMBOL #10 2D 9A GRAPHIC SYMBOL #10 2E 9A GRAPHIC SYMBOL #10 2F 9A GRAPHIC SYMBOL #10 30 20 SPACE 31 14 20 CPI TEXT TO FOLLOW 32 43 C 33 4F O 34 4E N 35 44 D 36 45 E 37 4E N 38 53 S 39 45 E 3A 44 D 3B 20 SPACE 3C 50 P 3D 52 R 3E 49 I 3F 4E N 40 54 T 41 20 SPACE 42 32 2 43 30 0 44 43 C 45 50 P 46 49 I 47 0D END OF LINE 2 48 04 START OF BOLD PRINT 49 42 B 4A 4F O 4B 4C L 4C 44 D 4D 04 END OF BOLD PRINT 4E 20 SPACE 4F 20 SPACE 50 53 S 51 54 T 52 41 A 53 4E N 54 44 D 55 41 A 56 52 R 57 44 D 58 20 SPACE 59 20 SPACE 5A 20 SPACE 5B 20 SPACE 5C 20 SPACE 5D 0D END OF THIRD LINE 5E 12 EXPANDED 5 CPI TEXT TO FOLLOW 5F 45 E 60 58 X 61 50 P 62 41 A 63 4E N 64 44 D 65 45 E 66 44 D 67 0D END OF 4TH LINE 68 19 START OF BAR CODE 39 DATA WITH FILLED IN GAP bar 45 E 6A 50 P code 6B 43 C sequence 6C 17 END OF BAR CODE 39 DATA 6D 80 BOX GRAPHICS - TOP LEFT CORNER 6E 81 BOX GRAPHICS - HORIZONTAL LINE 6F 81 BOX GRAPHICS - HORIZONTAL LINE 70 81 BOX GRAPHICS - HORIZONTAL LINE 71 81 BOX GRAPHICS - HORIZONTAL LINE 72 81 BOX GRAPHICS - HORIZONTAL LINE 73 82 BOX GRAPHICS - TOP RIGHT CORNER 74 0D END OF 5TH LINE 75 18 START OF BAR CODE 39 DATA WITHOUT FILLED IN GAP 76 45 E 77 50 P 78 43 C 79 17 END OF BAR CODE DATA 7A 85 BOX GRAPHICS - VERTICAL LINE 7B 42 B 7C 4F O 7D 58 X 7E 45 E 7F 53 S 80 85 BOX GRAPHIC - VERTICAL LINE 81 0D END OF 6TH LINE 82 16 START OF HUMAN READABLE CODE 39 DATA 83 45 E 84 50 P 85 43 C 86 17 END OF BAR CODE 39 DATA 87 86 BOX GRAPHICS - BOTTOM LEFT CORNER 88 81 BOX GRAPHICS - HORIZONTAL LINE 89 81 BOX GRAPHICS - HORIZONTAL LINE 8A 81 BOX GRAPHICS - HORIZONTAL LINE 8B 81 BOX GRAPHICS - HORIZONTAL LINE 8C 81 BOX GRAPHICS - HORIZONTAL LINE 8D 87 BOX GRAPHICS - BOTTOM RIGHT CORNER 8E 0D END OF 7TH LINE AND FILE

Detailed Description Paragraph Table - DETL (4): TABLE 4 EXAMPLE OF CHARACTER BUFFER PRIOR TO PRINTING LINE 1, PRINTING TWO LABELS ACROSS IN

GROUP MODE BYTE DATA DESCRIPTION

00 9A GRAPHIC SYMBOL #10 - NO AUTO CENTERING 01 9A GRAPHIC SYMBOL #10 02 9A GRAPHIC SYMBOL #10 03 9A GRAPHIC SYMBOL #10 04 9A GRAPHIC SYMBOL #10 05 20 SPACE 06 0A 30 CPI TEXT TO FOLLOW (converted from "09") 07 53 S 08 55 U 09 50 P 0A 45 E 0B 52 R 0C 20 SPACE 0D 43 C 0E 4F O 0F 4E N 00 44 D 11 45 E 12 4E N 13 53 S 14 45 E 15 44 D 16 20 SPACE 17 50 P 18 52 R 19 49 I 1A 4E N 1B 54 T 1C 20 SPACE 1D 33 3 1E 30 0 1F 43 C 20 50 P 21 49 I horizontal tab)ND OF LINE 1 ("09" 23 9A GRAPHIC SYMBOL #10 - NO AUTO CENTERING 24 9A GRAPHIC SYMBOL #10 25 9A GRAPHIC SYMBOL # 10 26 9A GRAPHIC SYMBOL #10 27 9A GRAPHIC SYMBOL #10 28 20 SPACE 29 0A 30 CPI TEXT TO FOLLOW 2A 53 S 2B 55 U 2C 50 P 2D 45 E 2E 52 R 2F 20 SPACE 30 43 C 31 4F O 32 4E N 33 44 D 34 45 E 35 4E N 36 53 S 37 45 E 38 44 D 39 20 SPACE 3A 50 P 3B 52 R 3C 49 I 3D 4E N 3E 54 T 3F 20 SPACE 40 33 3 41 30 0 42 43 C 43 50 P 44 49 I 45 09 END OF LINE 1 46 0D CARRIAGE RETURN

Claims Text - CLTX (1): 1. A method of printing labels with a computer controlled impact printer, said printer having a resolution of at least 100 pixels per inch, said printer having a text mode and a graphics mode of operation, said printer responding in text mode to predefined text codes by printing text images and responding in graphics mode to packets of pixel data by printing said pixel data; said printer including memory means for storing data and input means for receiving input and instructions from the user of said printer; the steps of the method comprising:

Claims Text - CLTX (3): storing a multiplicity of label designs in said memory means, the information in each said label design being formated in accordance with a predefined label data structure having means for specifying on a line by line basis one or more text strings and the position of said text strings in said label, and one or more of said graphic images and the position of said graphic images in said label, wherein said text and said graphic images can be positioned side by side;

Claims Text - CLTX (4): accepting input from said user specifying the identity of one or more of said label designs to be printed, the quantity of each said specified label design to be printed, and the order in which to print said label designs; and

Claims Text - CLTX (5): controlling the printing of said specified label designs by said printer on forms of blank labels having rows of blank labels with a known number of blank labels in each said row, by repetitively performing the steps of

Claims Text - CLTX (7): generating, in accordance with said specified order, a first list of the label designs to be printed on said row of blank labels, and

Claims Text - CLTX (8): for each line of said selected label designs:

Claims Text - CLTX (9): generating, from said list of label designs and said stored label designs, a second list of the text strings and graphic images to be printed on said line, said list including positioning information for said text strings and said graphic images,

Claims Text - CLTX (19): each said line of said label designs is Y pixels high, where Y is larger than X; and

Claims Text - CLTX (20): said method includes performing, for each line of said selected label designs, the steps of:

Claims Text - CLTX (24): 4. A method of printing labels with a computer controlled impact printer, said printer having a text mode and a graphics mode of operation, said printer responding in text mode to predefined text codes by printing text images and responding in graphics mode to packets of pixel data by printing said pixel data; said printer including memory means for storing data and input means for receiving input and instructions from the user of said printer; the steps of the method comprising:

Claims Text - CLTX (25): storing a multiplicity of label designs, each label design specifying one or more text strings and the position of said text strings in said label design, and one or more graphic images and the position of said graphic images in said label, wherein said text and said graphic images can be positioned side by side; and

Claims Text - CLTX (26): controlling the printing of a specified quantity of specified one of said stored label designs, in a specified order, on blank sheets of labels having labels organized in rows with a plurality of blank labels in each row, by repetitively performing the steps of

Claims Text - CLTX (28): selecting, in accordance with said specified order, the labels to printed on the current row of blank labels; and

Claims Text - CLTX (33): 5. Printing apparatus for printing label designs on blank labels, said blank labels being organized in rows of one or more labels per row, comprising:

Claims Text - CLTX (35): computer means coupled to said printer for printing specified label designs, said computer means including input means for receiving input and instructions from the user of said printer, memory means for storing data, and software means for performing the steps of:

Claims Text - CLTX (37): storing a multiplicity of label designs in said memory means, the information in each said label design being formated in accordance with a predefined label data structure having means for specifying on a line by line basis one or more text strings and the position of said text strings in said label, and one or more of said graphic images and the position of said graphic images in said label, wherein said text and said graphic images can be positioned side by side;

Claims Text - CLTX (38): accepting input from said user specifying the identity of one or more of said label designs to be printed, the quantity of each said specified label design to be printed, and the order in which to print said label designs; and

Claims Text - CLTX (39): controlling the printing of said specified label designs by said printer on forms of blank labels having rows of blank labels with a known number of blank labels in each said row, by repetitively performing the steps of

Claims Text - CLTX (41): generating, in accordance with said specified order, a first list of the label designs to be printed on said row of blank labels, and

Claims Text - CLTX (42): for each line of said selected label designs:

Claims Text - CLTX (43): generating, from said list of label designs and said stored label designs, a second list of the text strings and graphic images to be printed on said line, said list including positioning information for said text strings and said graphic images,

Claims Text - CLTX (48): said software includes means for storing said box codes in said label designs to represent lines and boxes in said label designs, and means for commanding said printer to print the corresponding box drawing component text images in text mode.

Claims Text - CLTX (51): each said line of said label designs is Y pixels high, where Y is larger than X;

Claims Text - CLTX (52): said software means includes means for performing, for each line of said selected label designs, the steps of:

Claims Text - CLTX (63): each said line of said label designs is Y pixels high, where Y is larger than X;

Claims Text - CLTX (64): said software means includes means for performing, for each line of said selected label designs, the steps of:

Claims Text - CLTX (69): said predefined label data structure includes means for specifying that the corresponding label design includes a serial number which increments each time said label design is printed, and means for specifying the position of said serial number in said label design;

Claims Text - CLTX (70): each said stored label design includes means for storing the current value of the serial number associated with said label design; and

Claims Text - CLTX (72): for each label design in said first list which includes a serial number, including in said second list for the line of said label design where said serial number is positioned text corresponding to the current serial number value associated with said label design, and incrementing said serial number value associated with said label design.

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INVENTOR-INFORMATION:

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ABSTRACT: The label generation apparatus enables the user to define a label of arbitrary size, shape and characteristics. Each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence. The label generation apparatus includes a template generation capability that enables the user to define the basic label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence. The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus.
63 Claims, 12 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 5

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Abstract Text - ABTX (1): The label generation apparatus enables the user to define a label of arbitrary size, shape and characteristics. Each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence. The label generation apparatus includes a template generation capability that enables the user to define the basic label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence. The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus.

US Patent No. - PN (1): 4939674

TITLE - TI (1): Label generation apparatus

Brief Summary Text - BSTX (2): This invention relates to the creation of labels and, in particular, to apparatus for generating a series of labels each of which is individually identified by certain unique indicia printed thereon.

Brief Summary Text - BSTX (4): It is a problem in the field of label making to inexpensively and efficiently produce labels that are individually identifiable. The art of label making can be classified into two categories. The first category is the generation of a large number of identical labels, such as that found on the vast majority of articles that are available for retain purchase. The generating of these identical labels requires the creation of a permanent printing master which is then used repetitively to generate identical labels in large numbers. The second type of label generation is the creation of a number of printed labels or documents that contain varying indicia printed thereon, where the variation in indicia is according to a well defined and commonly used numbering scheme. An example of this is the printing of checks or bank drafts where the series of checks are printed in sequential order according to a fixed numbering scheme. The generation of these printed documents requires the creation of a permanent or semi-permanent printing master that identifies the depositor and the depositor's account number, which information is printed on every check in the series. The varying indicia are the check numbers in the series, however this indicia is obtained by the use of a standard set of printing masters that are used for all similarly numbered checks printed by the bank. Thus, in this application, only a small number of permanent printing masters are required to be able to print all checks for all depositors since the numbering scheme typically runs from 100 to 9,999.

Brief Summary Text - BSTX (7): The above described problems are solved and a technical advance achieved in the field by the label generation apparatus of this invention that enables the user to define a label of arbitrary size, shape and characteristics, wherein each label in a series of labels includes unique indicia that individually identifies each label according to any predefined sequence.

Brief Summary Text - BSTX (8): The label generation apparatus includes a template generation capability that enables the user to define the basic label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence.

Brief Summary Text - BSTX (9): The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus. The indicia can be alphanumeric characters, bar codes, colors, magnetically written codes, or any other writable indicia. The user of the label generation apparatus specifies the type of indicia or combinations of the above listed indicia that are to be printed on the individual labels.

Brief Summary Text - BSTX (10): The user also specifies the ordering to be used in the generation of this indicia. This ordering can be any arbitrarily selected sequence, for

example: indicia sequentially numbered according to any numbering system such as binary, decimal, hexidecimal; indicia ordered according to a series such as odd numbers, even numbers; indicia arbitrarily matched to a data file, such as printing a label for each employee according to their social security number; mixed mode indicia, such as printing one hundred sequentially numbered labels for each department in a corporate organization; or any other conceivable indicia ordering that is desired by the user. Once the scheme of ordering the indicia and the starting and ending indicia are defined by the user, the indicia generation apparatus generates data indicative of all of the indicia to be used in the series of labels that are to be printed. This data is then combined with template definition data to create a set of information that defines each label in the series of individually identified labels. This data is then used by the label generation apparatus to drive a printing mechanism to transfer the defined individually identified labels onto a label media.

Brief Summary Text - BSTX (11): One exemplary embodiment of this label generation apparatus is the use of a computer to generate the definition of the label template and the label indicia. The computer also combines this data to produce the final information that represents individually identified labels. The computer then drives a printing mechanism such as an electrostatic printer that produces the final labels on the label media. Additional equipment can be used to provide an adhesive backing to the labels so printed to thereby provide the user with individually identified labels in a form and format that is convenient for the particular application.

Brief Summary Text - BSTX (12): Thus, this apparatus produces individually identified items without the use of a permanent or semi-permanent printing master. The label generation apparatus generates labels of arbitrary size, shape, and configuration, as defined by the user and media used for the labels. These and other advantages of this apparatus are illustrated in the detailed description below.

Drawing Description Text - DRTX (2): FIG. 1 illustrates in block diagram form the architecture of the label generation apparatus;

Drawing Description Text - DRTX (3): FIG. 2 illustrates in flow diagram form the overall functional structure of the label generation apparatus in flow, diagram form;

Drawing Description Text - DRTX (4): FIG. 3 illustrates a typical output format for a series of ordered labels;

Drawing Description Text - DRTX (5): FIGS. 4 through 8 illustrate typical label configurations that can be generated using this apparatus;

Detailed Description Text - DETX (2): The label generation apparatus of this invention enables the user to define a label of arbitrary size, shape and characteristics, wherein each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence.

Detailed Description Text - DETX (3): The label generation apparatus includes a template generation capability that enables the user to define the basic label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence.

Detailed Description Text - DETX (4): The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus. The indicia can be alphanumeric characters, bar codes, colors, magnetically written codes, or any other writable indicia. The user of the label generation apparatus specifies the type of indicia or combinations of the above listed indicia that are to be printed on the individual labels. The user also specifies the ordering to be used in the generation of this indicia. This ordering can be any arbitrarily selected sequence, for example: indicia sequentially numbered according to any numbering system such as binary, decimal, hexidecimal; indicia ordered according to a series such as odd numbers, even numbers; indicia arbitrarily matched to a data file, such as printing a label for each employee according to their social security number; mixed mode indicia, such as printing one hundred sequentially numbered labels for each department in a various corporate organization; or any other conceivable indicia ordering that is desired by the user. Once the scheme of ordering the indicia and the starting and ending indicia are defined by the user, the indicia generation apparatus generates data indicative of all of the indicia to be used in the series of labels that are to be printed. This data is then combined with template definition data to create a set of information that defines each label in the series of individually identified labels. This data is then used by the label generation apparatus to drive a printing mechanism to transfer the defined individually identified labels onto a label media.

Detailed Description Text - DETX (5): One exemplary embodiment of this label generation apparatus is the use of a computer to generate the definition of the label template and the label indicia. The computer also combines this data to reduce the final information that represents individually identified labels. The computer then drives a printing mechanism such as an electrostatic printer that produces the final labels on the label media. Additional equipment can be used to provide an adhesive backing to the labels so printed to thereby provide the user with individually identified labels in a form and format that is convenient for the particular application.

Detailed Description Text - DETX (7): FIG. 1 illustrates the architecture of the preferred embodiment of the label generation apparatus in block diagram form. This label generation apparatus includes one or more processors (101-1 to 101-n), each of which is a small computer such as a commercially available personal computer. The plurality of processors (101-1 through 101-n) are each interconnected via an associated bus (102-1 to 102-n) to one or more input/output processors 103. The function of the input/output processor 103 is to act as a buffer to receive and temporarily store data files that are output by the one or more processors 101-1 to 101-n. These data files are output by input/output processor 103 over one of the one or more output bus leads 104-

1 to 104-k. These output bus leads 104-1 to 104-k interconnect input/output processor 103 with one or more printers 107-1 to 107-k. Each printer illustrated in FIG. 1 is equipped with a raster processing machine 105-1 to 105-k that is interposed between the associated printer 107-1 to 107-k and the corresponding output bus lead 104-1 to 104-k. The function of the raster processing machine is to convert the data file that is down loaded from one of processors 101-1 to 101-n into a form and format that is usable by the associated printer 107-1 to 107-k. The raster processing machines 105-1 to 105-k can be stand alone units as illustrated in FIG. 1 or can be incorporated into the associated printer 107-1 to 107-k. The stand alone units are described herein for illustration purposes.

Detailed Description Text - DETX (8): For example, processor 101-1 generates an output data file to control the operation of printer 107-k. Processor 101-1 transmits this output data file via bus 102-1 to input/output processor 103 where it is temporarily stored in a buffer. When printer 107-k is available to print the label definition data that is stored in this data file, input/output processor 103 transmits the data file in object code form via output data bus 104-k to raster processing machine 105-k that is associated with printer 107-k. Raster processing machine 105-k converts the object file into ASCII raster data that is used to drive the print mechanism in printer 107-k. The ASCII raster data is output a byte at a time by raster processing machine 105-k via control leads 106-k to printer 107-k to cause the printer 107-k to print the label definition data that is contained in the original data file that was transmitted by processor 101-1. In this preferred embodiment, the label generation apparatus is illustrated as including one or more processors 101-1 to 101-n and one or more printers 107-1 to 107-k. An alternative implementation is the use of a single processor and multiple printers or multiple processors and a single printer. Similarly, a single input/output processor 103 is illustrated in FIG. 1 while a plurality of these input/output processors may be used in a particular implementation. The selection of the numbers of the devices illustrated in FIG. 1 and their precise interconnection is a function largely of the capability of the devices selected. Thus, a powerful processor 101-1 can be used to drive a plurality of printers if the processor 101-1 can generate data files at a rate faster than a single printer can print the files. Therefore, depending on the throughput required of the label generation apparatus illustrated in FIG. 1, n processors can be used to drive k printers which are interconnected through one or more input/output processors 103. In some applications, input/output processor 103 can be dispensed with and a direct connection implemented between the one or more processors and the one or more printers. These are all implementation details that should not be construed to limit in any way the concept of the label generation apparatus described and claimed herein.

Detailed Description Text - DETX (11): One example of a state of the art printer that produces human readable output is the electrostatic plotter, such as Versatce.TM. VS3000 plotter manufactured by Versatec, Inc. of Santa Clara, Calif. or the ColorWriter 400 plotter manufactured by Synergy Computer Graphics Corporation, of Sunnyvale, Calif. The electrostatic plotter uses four toner colors (black, cyan, magenta, yellow) to produce 2048 output colors. The plotter produces 400 pixels per inch onto

the print media which typically is a 24", 36" or 44" by 200 foot roll of mylar. Other print media can be used, such as paper or other transparent materials. In addition, a sandwich or composite label can be produced, with the label printed on paper and overlayed with a protective transparent layer. The plotter includes a raster processing machine either as an integral part of the plotter or a separate stand-alone unit. The raster processing machine receives print data from the processor generating the label data via an RS232C serial interface. The raster processing machine accepts industry-standard data formats and rasterizes this data into printer control signals.

Detailed Description Text - DETX (13): A printer such as the electrostatic plotter can produce colors, alphanumeric characters, bar codes that can be read by a human or a machine vision system. Thus, the electrostatic plotter can produce a wide spectrum of label formats and, for that reason, is described in the preferred embodiment. Other printer mechanisms can be used to produce magnetically readable indicia such as MICR printers, but are not described in detail herein.

Detailed Description Text - DETX (15): The remaining elements on FIG. 1 consist of the control routines 111-114 that are loaded in each of processors 101-1 to 101-n. These control routines are used to construct the database or data file that is used to drive the printer to produce the labels desired by the user. These control routines include user interface 114 which is a routine to interface the label generation apparatus in user friendly fashion with the user at the keyboard and display of one of the processors, for example processor 101-1. This user interface 114 can be menu driven software that permits the user to select the label format and define the label content as well as the number of labels to be produced by label generation apparatus. The data obtained through user interface 114 drives template generator 111 and indicia generator 112.

Detailed Description Text - DETX (16): Template generator 111 produces a definition of the replicated part of the label. This replicated part of the label may include printed delimiters that are used to define various writable indicia fields. The indicia field delimiters may also be simply predefined areas on the label that are not separated by any printed delimiters. In addition, template generator 111 produces the standard invariant textual or visual information that is part of the standard label design. Template generator 111 can also produce registration marks (r on FIG. 3) that are used to indicate bench mark positions on the label media that is printed with one or more of the labels. The registration marks become important when entire sheets of labels are produced by the printer and these sheets of labels must be cut into individual labels. The registration marks provide alignment points which can be used by an automatic cutting device to accurately cut the labels according to a predetermined pattern. Another function of template generator 111 is to generate stop and start characters when the indicia to be printed on the label comprises a bar code in whole or in part. A typical bar code includes start and stop characters such as a dollar sign or an asterisk at the beginning and end of the bar code field. Since these characters are immutable from label to label, template generator 111 can produce these characters as part of the overall label template.

Detailed Description Text - DETX (17): Template generator 111 can consist of the above described label template or can also include a sheet template (FIG. 3) that generates a plurality of the label templates to be printed on an entire sheet of label media by the printer. An example of such an arrangement is the printing of a sheet of labels consisting of a matrix of N by M labels arranged in linear fashion. Thus, the sheet template can replicate the individual label template into a pattern of N by M label templates and adds the appropriate registration marks r on to the sheet of labels that are to be printed. The definition provided by the user through user interface 114 indicates the configuration of labels that are to be printed by the printer.

Detailed Description Text - DETX (18): A plurality of sheets of labels wherein each sheet consists of n by m labels can be designated by the user. FIG. 3 illustrates one sheet definition arrangement. A master block (ex-M.sub.1,1) is defined as a matrix of m * n labels arranged in m rows of n labels each. The master block M.sub.1,1 is itself replicated as the element in an 1 * k matrix. Thus, by this process, an array of N * M labels is defined where N=m * 1 and M=n * k. Furthermore, this sheet definition can be replicated sequentially any number of times along the length of the label media.

Detailed Description Text - DETX (19): Template generator 111 is typically a library of standard label designs or formats that can be selected by the user. These label designs are produced, for example, by the use of a graphics software package that is included in template generator 111 on-line on one of processors 101-1 to 101-n or off-line on another processor (not shown) as a stand-alone unit. Such graphics software packages are well known and include the following commercially available packages: ISSCO, CATIA, CADRAM, UNIRAS, Precision Visuals, AutoCAD, SAS, D-Pict, PATRAN, Graphics Software Systems/CGI. The user generates the label template, including delimiters, textual and visual information as well as printing registration marks, using a graphics software package and stores this information in template generator 111 as a library routine that can be accessed for label generation purposes.

Detailed Description Text - DETX (21): Indicia generator 112 defines and generates the indicia that are produced for the writable indicia fields in the labels defined by template generator 111. The user via user interface 114 defines the type and character of the indicia to be produced, the ordering of the indicia from label to label and the starting and stopping points of the indicia. Thus, the labels produced by the label generation apparatus can be sequentially numbered, ordered according to a predefined series or matched to a database input by the user containing an arbitrary indicia listing. Indicia generator 112 produces the sequence of indicia via the use of program control instructions that define the ordered sequence selected by the user. The program control instructions typically are mathematical routines that define the sequence of indicia. As with the template definitions, the indicia sequences can be a library of standard software routines that are user-selectable or can be a user programmed sequence. Indicia generator 112 responds to the selection of the desired ordering as well as data input by the user through user interface 114 defining the form of the indicia to be used. The indicia consists of any sort of identification that can be printed on the label. This

identification can be bar codes, alphanumeric codes, magnetic strips, color codes or any other sort of indicia that can be conceived.

Detailed Description Text - DETX (22): Once the indicia form is defined, the user through user interface 114 defines the format of the indicia. The format can be the order that the indicia are printed in the writable indicia fields, the specific combination of indicia such as selecting either a single set of indicia or duplicate or redundant indicia. An example of redundant indicia is the case where a bar code is printed on the label, and adjacent to the bar code is written the numeric equivalent of the bar code characters. An alternative is the use of color coded indicia that are written into each of the writable indicia fields on top of which is written the corresponding alphanumeric character that matches the defined color coding. Similar arrangements can be used and are discussed below for MICR encoding, alphanumerics, color coding and bar coding. The user can also define the starting value of the indicia to be printed in the first label in the series of labels that are printed.

Detailed Description Text - DETX (23): Once the various parameters defining the indicia are input to indicia generator 112 via user interface 114, indicia generator 112 generates the series of indicia that are used to individually identify all of the labels in the series of labels that are to be printed. Indicia generator 112 generates the first set of indicia based on the data input by the user through user interface 114 and then calculates the next indicia values based on the defined ordering provided by the user. The indicia values are calculated on a label by label basis and stored in a data file typically on a sheet by sheet basis. Once the data file defining the various indicia values is completed, the indicia values are converted into control signals corresponding to the form and format as well as the content of the indicia. File merge routine 113 combines the template generated by template generator 111 with the indicia information generated by indicia generator 112 into an object file which is stored in processor 101-1. This object file contains all of the data necessary to define all of the labels in the series of individually identified labels that are to be printed by the label generation apparatus.

Detailed Description Text - DETX (26): Label Generation Control Software

Detailed Description Text - DETX (32): Label Formats

Detailed Description Text - DETX (33): FIGS. 4-8 illustrate various label formats wherein combinations of human and machine readable indicia are printed on a label. FIG. 4 illustrates a typical magnetic tape cartridge label 400 that is well known in the art. This label 400 consists of a rectangular shaped label contained a plurality of indicia fields 411-416 each of which is coded with a background color 431-436 and a alphanumeric character 421-426 printed therein. The color 431-436 and alphanumeric character 421-426 indicia uniquely identify each magnetic tape cartridge. Each indicia field 411-416 can be separated from an adjacent indicia field by the use of a delimiter or printing trap 441 that consists of a solid line but the use of such a printed delimiter is not required.

Detailed Description Text - DETX (35): FIG. 6 illustrates a typical bar code label that contains a rectangular shaped field of indicia containing a bar code 601 and the corresponding OCR characters 602. The bar code 601 and associated OCR characters 602 provide a unique human readable and machine readable identification of the object to which the label is affixed. No printed delimiters are used in this label to separate the bar code 601 from the OCR characters 602. In addition, no textual or visual information or background printing is illustrated in this label.

Detailed Description Text - DETX (38): Label Generation Process

Detailed Description Text - DETX (39): The difficulty with the existing label generation systems is that these systems can either generate a vast quantity of identical labels or a number of differently identified labels according to a well defined and commonly used numbering scheme. None of the existing systems can generate arbitrarily varying indicia according to any predetermining ordering for printing on labels to individually identify each label without using permanent or semi-permanent printing masters. The label generation apparatus of the present invention enables a user to define a label of arbitrary size, shape and characteristics, wherein each label in a series of labels includes unique indicia that individually identifies each label according to any predefined sequence in both human readable and machine readable form without using printing masters.

Detailed Description Text - DETX (40): The label generation apparatus includes the control structure illustrated in FIGS. 2 and 3 in flow diagram form. The control structure of FIGS. 2 and 3 consists of a plurality of software routines resident on processor 101-1 to 101-n. In order to better understand the operation of the control structure illustrated in FIGS. 2 and 3, the generation of a plurality of the label illustrated in FIG. 5 is described. A sheet of label media is used to produce a matrix of n times m of the labels of FIG. 5. This matrix arrangement is illustrated in FIG. 3 wherein one sheet of the label media containing N times M labels are illustrated. The process of label generation begins at step 200 on FIG. 2. Processor 101-1 prompts the user at the associated keyboard at step 201 to enter initializing information to identify the label format, i.e.--the label of FIG. 5, as well as the initial value used for the indicia written on this label. The user at this step also inputs the final label value or the quantity of labels that are to be printed. It is assumed that there is a standard correspondence between the alphanumeric characters printed on the label and the color background printed in the indicia fields. If the user wishes to vary this standard correspondence, data can be entered at step 201 to redefine the correspondence in processor 101-1. Assume for the purpose of this description that the standard format and color/numeric correspondence is desired. At step 202, the user defines the starting x and y position coordinates of the label generation on the sheet of label media.

Detailed Description Text - DETX (41): In response to the data entered by the user at steps 201 and 202, processor 101-1 retrieves the initial label value entered by the user and sets the label count variables equal to 1. Processing advances to step 204 where the label template is retrieved from the memory of processor 101-1. This label template

consists of all of the standard non-indicia printing on the label. The label template includes the vertical and horizontal print traps that function as delimiters to identify each indicia field on the label. The label template also includes the start and stop characters in the bar code. Any other invariant printing on the label is also drawn at this point. For the purpose of this description, the term "draw" indicates the generation of the control information required to activate one of printers 107-1 to 107-k to actually print the identified information on the label media. In the multi processing environment illustrated in FIG. 1, the entire sheet of label media is typically drawn at the same time rather than on a label by label basis as processor 101-1 generates the control signals. Thus, the control process illustrated in FIGS. 2 and 3 result in the generation of a data file that consists of all of the control information required to activate one of printers 107-1 to 107-k to produce an entire sheet or collection of sheets of labels. Thus, at step 204 when processor 101-1 "draws" the label template for the first label in the series of labels, processor 101-1 stores the data indicative of the template in a data file associated with this print job.

Detailed Description Text - DETX (43): At step 205, processor 101-1 retrieves the present value of the label indicia which, in this case, is the initial label value input by the user at step 201. At step 206, processor 101-1 converts the present label value into a set of optical character recognition (OCR) characters. These characters are drawn at step 207 in the appropriate indicia fields in the label template. At step 208, processor 101-1 obtains the correspondence between the generated OCR characters and the background colors required for each of the indicia fields in which these OCR characters are printed. At step 209, processor 101-1 generates the control signals to activate the printer to draw the colored area fills for each of the indicia fields in the label. At step 210, processor 101-1 retrieves the bar code values corresponding to the generated OCR characters. At step 211 these bar codes are drawn in appropriate indicia fields in the label template. This step completes the generation of a single label including the label template, the OCR characters, color background indicia and bar codes.

Detailed Description Text - DETX (45): Once the label is completed, processing advances to step 212 where processor 101-1 increments the label count, the horizontal position variable and the value of the label indicia. The label indicia can be numbered according to any predetermined ordering that is required by the user. This can be a sequential numbering, an ordered series, or correspondence to any input data file provided by the user. Thus, label count and label indicia value record are maintained separately by processor 101-1 since the label numbering may not be sequential and may not match the label count. Processor 101-1 must increment the label count at step 212 and generate the next label indicia value according to whatever predetermined ordering has been identified by the user. At step 213, processor 101-1 increments the horizontal position variable. At step 214, processor 101-1 compares the horizontal position variable with the defined maximum number of horizontal print positions for the particular sheet of label media to be printed. Thus, in the example of FIG. 8, a matrix of N times M labels are to printed on the sheet of label media. For the purpose of illustration, the number of labels on a master block M.sub.1,1 of label media is five rows of twenty columns. Thus, at steps 213 and 214, the horizontal position count is

incremented and compared with the delimiter of twenty to determine whether the entire row of twenty labels in the first block has been printed. If the entire row of twenty labels has not been printed, at step 214 processor returns control to step 204 where another label in the sequence of labels is generated. The processing of steps 204 to 214 continues until an entire row of twenty labels has been printed. At this point, processing advances to step 215 where the vertical position count is incremented and at step 216 compared with the maximum value (which for this case is five). Thus, steps 213 and 214 generate a row of twenty labels while steps 215 and 216 generate five rows of twenty labels.

Detailed Description Text - DETX (46): Once processing of this master block M.sub.1,.sup.1 of 100 labels in a 20.times.5 matrix has been completed, processing advances to step 217 where the vertical position variable is reset to 1 and the horizontal block position is incremented. At step 218, the horizontal block position is compared with the maximum value which in this case is 2. Similarly, steps 219 and 220 reset the horizontal block position to 1, increment the vertical block position and compare it with a maximum value which in this case is 5. Thus, steps 213-220 generate a matrix consisting of a master block of 100 labels in a 20 wide by 5 high configuration which master block is replicated twice horizontally and five times vertically on a sheet of label media to produce a series of 1,000 labels. This series can be of arbitrary length but for the purpose of illustration is indicated here to be a length of 1,000 which is a typical number that would be used. Once the entire 1,000 labels are printed using the control routine illustrated in FIGS. 2 and 3, processing advances to step 221 where the generation process is completed.

Detailed Description Text - DETX (48): At this point, the entire data file consisting of the template and the label indicia information for all 1,000 labels is stored in processor 101-1. Since the series of labels is ready for printing, processor 101-1 transmits this data file to input/output processor 103 via bus 102-1 where the data file is stored until one of printers 107-1-107-k is available to print this data file. Assume for the purpose of discussion that printer 107-1 is available to print the data file. Input/output processor 103 transmits the data file over output bus 104-1 to raster processing machine 105-1 associated with printer 107-1. Raster processing machine 105-1 converts the data file that is downloaded from processor 101-1 via input/output processor 103 into a form and format that is usable by printer 107-1. Raster processing machine 105-1 converts the object file form of the data file into ASCII raster data that is used to drive the print mechanism in printer 107-1. The type of control information that is provided in the object file are control signals indicative of which pen in the plotter is to produce a particular segment of the label, pen up and pen down commands, and data indicative of the starting position length and direction of each line or character printed on the label.

Detailed Description Text - DETX (50): The labels produced by the label generation apparatus (for example FIG. 4) comprise an elongated rectangular shape base sheet member 102 (see FIG. 9) made of clear plastic material, such as Mylar, having a flat, smooth, glossy front surface 104 and a flat back surface 106 which has been chemically treated to enable electrostatic ink printing thereon as generally indicated by ink layer

zone 108. The OCR alphanumeric characters 421-426 and corresponding colors 431-436 are reverse-printed with ink on the back surface 106 thereof in the printed ink zone 108 so as to be viewable in proper orientation through the front surface 104 thereof. Label graphics as they appear when viewed through front surface 104 are shown in FIG. 4, which is a front view of a back-printed plastic sheet. A layer of opaque adhesive material 110, FIG. 9, is fixedly adhered to the entire printed back surface 106 of the sheet member 102 in overlaying, covering relationship with the printed characters 421-426, and colors 431-436, thereon. Thus, unlinked portions (e.g. all of the spaces between the dark bars of the bar code alphanumeric characters in the second column 402 of FIG. 5) of the base sheet member material 102 appear to be the color of the opaque adhesive material 110 when viewed through the front surface 104 of base sheet member 102. The ink zone may have a single layer of ink, e.g. the black color bar code lines and the black color zone separating lines or multiple layers of ink where the black color alphanumeric indicia have a different color background overlay. A removable sheet 114 of backing material is removable adhered to the layer of opaque adhesive material 110, the backing material 114 being constructed of a substance such as treated paper which forms a weaker bond with the adhesive layer 110 than the plastic base member 102. Thus, the backing sheet is readily removable from the label prior to application of the label to a surface without removal of the adhesive layer 110 from the plastic layer 102.

Detailed Description Text - DETX (55): The composite web 196 initially passes through a scoring station 198 in which scoring blades 200, shown schematically in FIG. 10, provide a plurality of cuts 202. The knife 200 illustrated in FIG. 10 is shown raised above cut 202, but it will, of course, be understood that, during an actual cutting operation, the knife would be positioned within the area indicated by the cut 202. The cut 202 extends through the clear plastic layer 102 and adhesive layer 110, terminating at the interface 111 between the adhesive layer 110 and backing layer 114. A scored web 210, as shown in FIG. 10 including the areas shown in solid lines and in phantom lines, thus emerges from scoring station 198. A scrap web stripping means which may include a scrap windup spool 212 and an idler roll 213 is provided for stripping a continuous scrap web 214 from the scored web 210 to provide a stripped label stock web 216, as shown in FIG. 10 in solid lines only. The continuous scrap web 214, FIG. 10 in phantom, comprises the portions of plastic layer 102 and adhesive layer 100 other than the portions thereof associated with label graphics and none of the backing layer 114. The stripped label stock web 216 includes all of the continuous backing layer 14, the portion of plastic layer 102 which was back-printed with label graphics, and the portion of adhesive layer 110 directly underlying the portion of layer 102 with graphics printed thereon. The stripped label stock web 216 thus formed passes through a slitting station 218 whereat a plurality of slitting knives 220, FIG. 12, longitudinally slit the stripped label stock web 216 to from a slit label stock web 222 comprising a plurality of longitudinally-extending strips 224, 226, 228, 230, 232, etc., defined by cuts 217, which are each one label wide. The slit label stock web 222 is collected on a slit web windup spool 240, FIG. 11, and thus provides a plurality of rolls of label strip stock 224, 226, etc.

Claims Text - CLTX (1): 1. Apparatus for automatically producing a series of labels, each label in said series of labels containing a set of indicia individual to said label and ordered according to a user defined ordering, comprising:

Claims Text - CLTX (2): means for defining a label template having one or more writable indicia fields;

Claims Text - CLTX (3): means for automatically generating a set of indicia for each of said labels in said series of labels, wherein each successive set of indicia in said series of labels is ordered according to a user defined ordering;

Claims Text - CLTX (6): means for automatically printing each of said individually identified labels in said series of labels on to label media.

Claims Text - CLTX (10): means for generating label media registration marks.

Claims Text - CLTX (14): means responsive to said inserting means for converting said label template and inserted indicia into printing control signals defining individually identified labels.

Claims Text - CLTX (18): computer controlled printing apparatus for converting said printing control signals to printed indicia on said label media.

Claims Text - CLTX (22): defining a label template having one or more writable indicia fields;

Claims Text - CLTX (23): automatically generating indicia, individual to each label in said series of labels, according to the user defined ordering:

Claims Text - CLTX (25): inserting said generated indicia, individual to each label in said series of labels, and said color coding into said one or more indicia fields for each label in said series of labels; and

Claims Text - CLTX (26): automatically printing each of said individually identified labels in said series of labels on to label media.

Claims Text - CLTX (30): generating label media registration marks.

Claims Text - CLTX (34): converting said label template and inserted indicia into printing control signals defining individually identified labels.

Claims Text - CLTX (38): computer controlled printing apparatus for converting said printing control signals to printed indicia on said label media.

Claims Text - CLTX (42): means for defining a label template containing one or more writable indicia fields;

Claims Text - CLTX (43): means for automatically generating indicia for each of said indicia fields on each of said labels in said series according to a user defined label identification ordering to individually identify each label;

Claims Text - CLTX (44): means for combining said template and said generated indicia to produce a definition of a series of individually identified labels; and

Claims Text - CLTX (45): means for automatically printing said defined series of labels on label media.

Claims Text - CLTX (96): means for defining a sheet template consisting of a matrix of n*m label templates, where n>1 and m>1, each containing one or more writable indicia fields;

Claims Text - CLTX (97): means for automatically generating indicia for each of said indicia fields on each of said labels in said series according to a user defined label identification ordering to individually identify each label;

Claims Text - CLTX (98): means for combining said sheet template and said generated indicia to produce a definition of a series of individually identified labels; and

Claims Text - CLTX (99): means for printing said defined series of labels on label media.

Claims Text - CLTX (107): means for defining a label set template comprising an n*m pattern of individual label templates, where n>1 and m>1, each of which includes k writable information fields;

Claims Text - CLTX (109): means for inserting the k characters of each successive one of said n*m indicia in the corresponding writable information fields of successive individual label templates.

Claims Text - CLTX (112): means for defining a label template having one or more writale indicia fields;

Claims Text - CLTX (113): means for automatically generally indicia for each of said indicia fields on each of said labels in said series according to a user defined label identification ordering to individually identify each label;

Claims Text - CLTX (114): means for combining said label template and said generated indicia;

Claims Text - CLTX (116): printer apparatus for printing labels on a label medium;

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TITLE: Label generation apparatus
DATE-ISSUED: April 15, 1997
INVENTOR-INFORMATION:

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ABSTRACT: The label generation apparatus of this invention enables the user to define a label of various sizes, shapes and characteristics, wherein each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence. These labels also contain template fields that vary according to the indicia printed thereon or any other predefined ordering. The label generation apparatus includes a template generation capability that enables the user to define a label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence. The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus.
60 Claims, 19 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 10

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Abstract Text - ABTX (1): The label generation apparatus of this invention enables the user to define a label of various sizes, shapes and characteristics, wherein each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence. These labels also contain template fields that vary according to the indicia printed thereon or any other predefined ordering. The label generation apparatus includes a template generation capability that enables the user to define a label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence. The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus.

US Patent No. - PN (1): 5621864

TITLE - TI (1): Label generation apparatus

Brief Summary Text - BSTX (2): This invention relates to the creation of labels and, in particular, to apparatus for generating a series of labels, each of which is individually identified by certain unique indicia and template fields printed thereon.

Brief Summary Text - BSTX (4): It is a problem in the field of label making to inexpensively and efficiently produce labels that are individually identifiable. The art of label making can be classified into two categories. The first category is the generation of a large number of identical labels, such as that found on the vast majority of articles available for retail purchase. The generation of these identical labels requires the creation of a permanent printing master which is repetitively used to generate identical labels in large numbers. The second type of label generation is the creation of a number of printed labels or documents that contain varying indicia printed thereon, where the variation in indicia is according to a well defined and commonly used numbering scheme. An example of this is the printing of checks or bank drafts where the series of checks are printed in sequential order according to a fixed numbering scheme. The generation of these printed documents requires the creation of a permanent or semi-permanent printing master that identifies the depositor and the depositor's account number, which information is printed on every check in the series. The varying indicia are the check numbers in the series, and this indicia is obtained by the use of a standard set of printing masters that are used for all similarly numbered checks printed by the bank. Thus, in this application, only a small number of permanent printing masters are required to be able to print all checks for all depositors since the numbering scheme typically runs from 100 to 9,999. In addition, the template or background information on these labels is fixed for all labels, regardless of the indicia printed thereon.

Brief Summary Text - BSTX (7): The above described problems are solved and a technical advance achieved in the field by the label generation apparatus of this invention. This apparatus enables the user to define a label of various sizes, shapes and characteristics, wherein each label in a series of labels includes both unique indicia that individually identifies each label according to any predefined sequence and template fields that vary according to the indicia printed thereon or any other predefined ordering.

Brief Summary Text - BSTX (8): The label generation apparatus includes a template generation capability that enables the user to define a label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence. The template itself contains one or more variable format fields, wherein the template itself varies as a function of the indicia printed thereon or as a function of any other defined ordering. Thus, the indicia and template fields can both vary from label to label.

Brief Summary Text - BSTX (9): The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus. The indicia can be alphanumeric characters, bar codes, colors, or any other writable indicia. The user of the label generation apparatus specifies the type of indicia or combinations of the above listed indicia that are to be printed on the individual labels.

Brief Summary Text - BSTX (10): The user also specifies the ordering to be used in the generation of this indicia. This ordering can be any arbitrarily selected sequence, for example: indicia sequentially numbered according to any numbering system such as binary, decimal, hexidecimal; indicia ordered according to a series such as odd numbers, even numbers; indicia arbitrarily matched to a data file, such as printing a label for each employee according to their social security number; mixed mode indicia, such as printing one hundred sequentially numbered labels for each department in a corporate organization; or any other conceivable indicia ordering that is desired by the user. Once the scheme of ordering the indicia and the starting and ending indicia are defined by the user, the indicia generation apparatus generates data indicative of the indicia to be used in the series of labels, which data is combined with template definition data to create a set of information that defines each label in the series of individually identified labels.

Brief Summary Text - BSTX (11): The label generation apparatus uses template generation software that produces template definitions that vary according to various criteria specified by the user of this apparatus. The template variability can be colors, the type of codes imprinted on the label, variable indicia format as a function of label application, or any other variation envisioned by the user. The user of the label generation apparatus specifies the template formats that are to be printed on the individual labels. The user also specifies the ordering to be used in the generation of the templates. This ordering can be any arbitrarily selected application, for example: labels having identical indicia but multiple formats such as printing a label for each employee's personnel file according to their social security number while also printing a different format label for the employee's medical file and a third format label for the employee's benefits file; changing the color of the labels printed as a function of a real time clock so that the color fields vary by month and year; or any other conceivable template configurations that are desired by the user. Once the scheme of ordering the templates are defined by the user, the template generation apparatus generates data indicative of all of the templates to be used in the series of labels that are to be printed. This data is then combined with indicia definition data to create a set of information that defines each label in the series of individually identified labels. This data is then used by the label generation apparatus to drive a printing mechanism to transfer the defined individually identified labels onto a label media.

Brief Summary Text - BSTX (12): One exemplary embodiment of this label generation apparatus is the use of a computer to generate the definition of both the label template and the label indicia. The computer also combines this data to produce the final information that represents individually identified labels. The computer then drives a printing mechanism such as an electrostatic printer that produces the final labels on the label media. Additional equipment can be used to provide an adhesive backing to the labels so printed to thereby provide the user with individually identified labels in a form and format that is convenient for the particular application.

Brief Summary Text - BSTX (13): Thus, this apparatus produces individually identified items without the use of a permanent or semi-permanent printing master. The label

generation apparatus generates labels of arbitrary size, shape, and configuration, as defined by the user and media used for the labels. These and other advantages of this apparatus are illustrated in the detailed description below.

Drawing Description Text - DRTX (2): FIG. 1 illustrates in block diagram form the architecture of the label generation apparatus;

Drawing Description Text - DRTX (3): FIG. 2 illustrates in flow diagram form the overall functional structure of the label generation apparatus in flow diagram form;

Drawing Description Text - DRTX (4): FIG. 3 illustrates a typical output format for a series of ordered labels;

Drawing Description Text - DRTX (5): FIGS. 4 through 8 illustrate typical label configurations that can be generated using this apparatus;

Drawing Description Text - DRTX (12): FIG. 15 illustrates the user display produced by the system to enable a user to define a label template; and

Drawing Description Text - DRTX (13): FIG. 16 illustrates the user display, including a defined label template.

Detailed Description Text - DETX (2): The label generation apparatus of this invention enables the user to define a label of various sizes, shapes and characteristics, wherein each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence and these labels also contain template fields that vary according to the indicia printed thereon or any other predefined ordering.

Detailed Description Text - DETX (3): The label generation apparatus includes a template generation capability that enables the user to define a label format having one or more writable indicia fields. These one or more writable indicia fields can be used to provide each label with individual identifying indicia according to any predetermined sequence. The template itself contains one or more variable format fields, wherein the template itself varies as a function of the indicia printed thereon or as a function of any other defined ordering. Thus, the indicia and template fields can both vary from label to label.

Detailed Description Text - DETX (4): The label generation apparatus also includes an indicia generation capability that produces the individual identification according to various characteristics that are specified by the user of this apparatus. The indicia can be alphanumeric characters, bar codes, colors, or any other writable indicia. The user of the label generation apparatus specifies the type of indicia or combinations of the above listed indicia that are to be printed on the individual labels.

Detailed Description Text - DETX (5): The user also specifies the ordering to be used in the generation of this indicia. This ordering can be any arbitrarily selected sequence,

for example: indicia sequentially numbered according to any numbering system such as binary, decimal, hexidecimal; indicia ordered according to a series such as odd numbers, even numbers; indicia arbitrarily matched to a data file, such as printing a label for each employee according to their social security number; mixed mode indicia, such as printing one hundred sequentially numbered labels for each department in a corporate organization; or any other conceivable indicia ordering that is desired by the user. Once the scheme of ordering the indicia and the starting and ending indicia are defined by the user, the indicia generation apparatus generates data indicative of the indicia to be used in the series of labels which data is combined with template definition data to create a set of information that defines each label in the series of individually identified labels.

Detailed Description Text - DETX (6): The label generation apparatus uses template generation software that produces template definitions that vary according to various criteria specified by the user of this apparatus. The template variability can be colors, the type of codes imprinted on the label, variable indicia format as a function of label application, or any other variation envisioned by the user. The user of the label generation apparatus specifies the template formats that are to be printed on the individual labels. The user also specifies the ordering to be used in the generation of the templates. This ordering can be any arbitrarily selected application, for example: labels having identical indicia but multiple formats such as printing a label for each employee's personnel file according to their social security number while also printing a different format label for the employee's medical file and a third format label for the employee's benefits file; changing the color of the labels printed as a function of a real time clock so that the color fields vary by month and year; or any other conceivable template configurations that are desired by the user. Once the scheme of ordering the templates are defined by the user, the template generation apparatus generates data indicative of all of the templates to be used in the series of labels that are to be printed. This data is then combined with indicia definition data to create a set of information that defines each label in the series of individually identified labels. This data is then used by the label generation apparatus to drive a printing mechanism to transfer the defined individually identified labels onto a label media.

Detailed Description Text - DETX (8): FIG. 1 illustrates the architecture of the preferred embodiment of the label generation apparatus in block diagram form. This label generation apparatus includes one or more processors (101-1 to 101-n), each of which is a small computer such as a commercially available personal computer. The plurality of processors (101-1 through 101-n) are each interconnected via an associated bus (102-1 to 102-n) to one or more input/output processors 103. The function of the input/output processor 103 is to act as a buffer to receive and temporarily store data files that are output by the one or more processors 101-1 to 101-n. These data files are output by input/output processor 103 over one of the one or more output bus leads 104-1 to 104-k. These output bus leads 104-1 to 104-k interconnect input/output processor 103 with one or more printers 107-1 to 107-k. Each printer illustrated in FIG. 1 is equipped with a raster processing machine 105-1 to 105-k that is interposed between the associated printer 107-1 to 107-k and the corresponding output bus lead 104-1 to 104-k.

The function of the raster processing machine is to convert the data file that is down loaded from one of processors 101-1 to 101-n into a form and format that is usable by the associated printer 107-1 to 107-k. The raster processing machines 105-1 to 105-k can be stand alone units as illustrated in FIG. 1 or can be incorporated into the associated printer 107-1 to 107-k. The stand alone units are described herein for illustration purposes.

Detailed Description Text - DETX (9): For example, processor 101-1 generates an output data file to control the operation of printer 107-k. Processor 101-1 transmits this output data file via bus 102-1 to input/output processor 103 where it is temporarily stored in a buffer. When printer 107-k is available to print the label definition data that is stored in this data file, input/output processor 103 transmits the data file in object code form via output data bus 104-k to raster processing machine 105-k that is associated with printer 107-k. Raster processing machine 105-k converts the object file into ASCII raster data that is used to drive the print mechanism in printer 107-k. The ASCII raster data is output a byte at a time by raster processing machine 105-k via control leads 106-k to printer 107-k to cause the printer 107-k to print the label definition data that is contained in the original data file that was transmitted by processor 101-1. In this preferred embodiment, the label generation apparatus is illustrated as including one or more processors 101-1 to 101-n and one or more printers 107-1 to 107-k. An alternative implementation is the use of a single processor and multiple printers or multiple processors and a single printer. Similarly, a single input/output processor 103 is illustrated in FIG. 1 while a plurality of these input/output processors may be used in a particular implementation. The selection of the numbers of the devices illustrated in FIG. 1 and their precise interconnection is a function largely of the capability of the devices selected. Thus, a powerful processor 101-1 can be used to drive a plurality of printers if the processor 101-1 can generate data files at a rate faster than a single printer can print the files. Therefore, depending on the throughput required of the label generation apparatus illustrated in FIG. 1, n processors can be used to drive k printers which are interconnected through one or more input/output processors 103. In some applications, input/output processor 103 can be dispensed with and a direct connection implemented between the one or more processors and the one or more printers. These are all implementation details that should not be construed to limit in any way the concept of the label generation apparatus described and claimed herein.

Detailed Description Text - DETX (12): One example of a state of the art printer that produces human readable output is the electrostatic plotter, such as the Versatec.TM. VS3000 plotter manufactured by Versatec, Inc. of Santa Clara, Calif. or the ColorWriter 400 plotter manufactured by Synergy Computer Graphics Corporation, of Sunnyvale, Calif. The electrostatic plotter uses four toner colors (black, cyan, magenta, yellow) to produce 2048 output colors. The plotter produces 400 pixels per inch onto the print media which typically is a 24", 36" or 44" by 200 foot roll of mylar. Other print media can be used, such as paper or other transparent materials. In addition, a sandwich or composite label can be produced, with the label printed on paper and overlayed with a protective transparent layer. The plotter includes a raster processing

machine either as an integral part of the plotter or a separate stand-alone unit. The raster processing machine receives print data from the processor generating the label data via an RS232C serial interface. The raster processing machine accepts industry-standard data formats and rasterizes this data into printer control signals.

Detailed Description Text - DETX (14): A printer such as the electrostatic plotter can produce colors, alphanumeric characters, bar codes that can be read by a human or a machine vision system. Thus, the electrostatic plotter can produce a wide spectrum of label formats and, for that reason, is described in the preferred embodiment. Other printer mechanisms can be used to produce magnetically readable indicia such as MICR printers, but are not described in detail herein.

Detailed Description Text - DETX (16): The remaining elements on FIG. 1 consist of the control routines 111-114 that are loaded in each of processors 101-1 to 101-n. These control routines are used to construct the database or data file that is used to drive the printer to produce the labels desired by the user. These control routines include user interface 114 which is a routine to interface the label generation apparatus in user friendly fashion with the user at the keyboard and display of one of the processors, for example processor 101-1. This user interface 114 can be menu driven software that permits the user to select the label format and define the label content as well as the number of labels to be produced by label generation apparatus. The data obtained through user interface 114 drives template generator 111 and indicia generator 112.

Detailed Description Text - DETX (17): Template generator 111 produces a definition of both the replicated and variable parts of the label. The replicated part of the label may include printed delimiters that are used to define various writable indicia fields. The indicia field delimiters may also be simply predefined areas on the label that are not separated by any printed delimiters. In addition, template generator 111 produces the standard invariant textual or visual information that is part of the standard label design. Template generator 111 can also produce registration marks (r on FIG. 3) that are used to indicate bench mark positions on the label media that is printed with one or more of the labels. The registration marks become important when entire sheets of labels are produced by the printer and these sheets of labels must be cut into individual labels. The registration marks provide alignment points which can be used by an automatic cutting device to accurately cut the labels according to a predetermined pattern. Another function of template generator 111 is to generate stop and start characters when the indicia to be printed on the label comprise a bar code in whole or in part. A typical bar code includes start and stop characters such as a dollar sign or an asterisk at the beginning and end of the bar code field. Since these start and stop characters are immutable from label to label, template generator 111 can produce these characters as part of the overall label template.

Detailed Description Text - DETX (18): Template generator 111 can consist of the above described label template or can also include a sheet template (FIG. 3) that generates a plurality of the label templates to be printed on an entire sheet of label

media by the printer. An example of such an arrangement is the printing of a sheet of labels consisting of a matrix of N by M labels arranged in linear fashion. Thus, the sheet template can replicate the individual label template into a pattern of N by M label templates and adds the appropriate registration marks r on to the sheet of labels that are to be printed. The definition provided by the user through user interface 114 indicates the configuration of labels that are to be printed by the printer.

Detailed Description Text - DETX (19): A plurality of sheets of labels wherein each sheet consists of n by m labels can be designated by the user. FIG. 3 illustrates one sheet definition arrangement. A master block (ex-M.sub.1,1) is defined as a matrix of m*n labels arranged in m rows of n labels each. The master block M.sub.1,1 is itself replicated as the element in an 1*k matrix. Thus, by this process, an array of N*M labels is defined where N=m*1 and M=n*k. Furthermore, this sheet definition can be replicated sequentially any number of times along the length of the label media.

Detailed Description Text - DETX (20): Template generator 111 is typically a library of standard label designs or formats that can be selected by the user. These label designs are produced, for example, by the use of a graphics software package that is included in template generator 111 on-line on one of processors 101-1 to 101-n or off-line on another processor (not shown) as a stand-alone unit. Such graphics software packages are well known and include the following commercially available packages: ISSCO, CATIA, CADRAM, UNIRAS, Precision Visuals, AutoCAD, SAS, D-Pict, PATRAN, Graphics Software Systems/CGI. The user generates the label template, including delimiters, textual and visual information as well as printing registration marks, using a graphics software package and stores this information in template generator 111 as a library routine that can be accessed for label generation purposes.

Detailed Description Text - DETX (21): Template generator 111 also defines and generates the variable template fields. The user, via user interface 114, defines the type and character of the variable format template fields to be produced, the ordering of the variable template fields and the indicia field correspondence among the variable template fields. Thus, the labels produced by the label generation apparatus can each be uniquely defined by the individual indicia contained thereon; or can be aggregated into subsets, where each subset consists of a plurality of labels, each label in a subset having at least one different template field but identical indicia such that each label in the subset contains identical indicia that are printed in varying format or configuration; or can be aggregated into subsets, where each subset consists of a plurality of labels, each label in a subset having at least one different template field and varying indicia such that each label in the subset contains some different indicia and some of the indicia are printed in varying format or configuration.

Detailed Description Text - DETX (23): Indicia generator 112 defines and generates the indicia that are produced for the writable indicia fields in the labels defined by template generator 111. The user, via user interface 114, defines the type and character of the indicia to be produced, the ordering of the indicia from label to label and the starting and stopping points of the indicia. Thus, the labels produced by the label generation

apparatus can be sequentially numbered, ordered according to a predefined series or matched to a database input by the user, and containing an arbitrary indicia listing. Indicia generator 112 produces the sequence of indicia via the use of program control instructions that define the ordered sequence selected by the user. The program control instructions typically are mathematical routines that define the sequence of indicia. As with the template definitions, the indicia sequences can be a library of standard software routines that are user-selectable or can be a user programmed sequence. Indicia generator 112 responds to the selection of the desired ordering as well as data input by the user through user interface 114 defining the form of the indicia to be used. The indicia consists of any sort of identification that can be printed on the label. This identification can be bar codes, alphanumeric codes, magnetic strips or color codes.

Detailed Description Text - DETX (24): Once the indicia form is defined, the user through user interface 114 defines the format of the indicia. The format can be the order that the indicia are printed in the writable indicia fields, the specific combination of indicia such as selecting either a single set of indicia or duplicate or redundant indicia. An example of redundant indicia is the case where a bar code is printed on the label, and adjacent to the bar code is written the numeric equivalent of the bar code characters. An alternative is the use of color coded indicia that are written into each of the writable indicia fields on top of which is written the corresponding alphanumeric character that matches the defined color coding. Similar arrangements can be used and are discussed below for MICR encoding, alphanumerics, color coding and bar coding. The user can also define the starting value of the indicia to be printed in the first label in the series of labels that are printed.

Detailed Description Text - DETX (25): Once the various parameters defining the indicia are input to indicia generator 112 via user interface 114, indicia generator 112 generates the series of indicia that are used to individually identify all of the labels in the series of labels that are to be printed. Indicia generator 112 generates the first set of indicia based on the data input by the user through user interface 114 and then calculates the next indicia values based on the defined ordering provided by the user. The indicia values are calculated on a label by label basis and stored in a data file typically on a sheet by sheet basis although this data can be stored on a label by label basis. Once the data file defining the various indicia values is completed, the indicia values are converted into control signals corresponding to the form and format as well as the content of the indicia. File merge routine 113 combines the template generated by template generator 111 with the indicia information generated by indicia generator 112 into an object file which is stored in processor 101-1. This object file contains all of the data necessary to define all of the labels in the series of individually identified labels that are to be printed by the label generation apparatus.

Detailed Description Text - DETX (28): Label Generation Control Software

Detailed Description Text - DETX (34): Label Formats

Detailed Description Text - DETX (35): FIGS. 4-8 illustrate various label formats wherein combinations of human and machine readable indicia are printed on a label. FIG. 4 illustrates a typical magnetic tape cartridge label 400 that is well known in the art. This label 400 consists of a rectangular shaped label contained a plurality of indicia fields 411-416 each of which is coded with a background color 431-436 and a alphanumeric character 421-426 printed therein. The color 431-436 and alphanumeric character 421-426 indicia uniquely identify each magnetic tape cartridge. Each indicia field 411-416 can be separated from an adjacent indica field by the use of a delimiter or printing trap 441 that consists of a solid line but the use of such a printed delimiter is not required.

Detailed Description Text - DETX (37): FIG. 6 illustrates a typical bar code label that contains a rectangular shaped field of indicia containing a bar code 601 and the corresponding OCR characters 602. The bar code 601 and associated OCR characters 602 provide a unique human readable and machine readable identification of the object to which the label is affixed. No printed delimiters are used in this label to separate the bar code 601 from the OCR characters 602. In addition, no textual or visual information or background printing is illustrated in this label.

Detailed Description Text - DETX (40): Label Generation Process

Detailed Description Text - DETX (41): The difficulty with the existing label generation systems is that these systems can either generate a vast quantity of identical labels or a number of differently identified labels according to a well defined and commonly used numbering scheme. None of the existing systems can generate arbitrarily varying indicia according to any predetermining ordering for printing on labels to individually identify each label without using permanent or semi-permanent printing masters. The label generation apparatus of the present invention enables a user to define a label of various sizes, shapes and characteristics, wherein each label in a series of labels includes unique indicia that individually identify each label according to any predefined sequence in both human readable and machine readable form without using printing masters.

Detailed Description Text - DETX (42): The label generation apparatus includes the control structure illustrated in FIGS. 2 and 3 in flow diagram form. The control structure of FIGS. 2 and 3 consists of a plurality of software routines resident on processor 101-1 to 101-n. In order to better understand the operation of the control structure illustrated in FIGS. 2 and 3, the generation of a plurality of the label illustrated in FIG. 5 is described. A sheet of label media is used to produce a matrix of n times m of the labels of FIG. 5. This matrix arrangement is illustrated in FIG. 3 wherein one sheet of the label media containing N times M labels are illustrated. The process of label generation begins at step 200 on FIG. 2. Processor 101-1 prompts the user at the associated keyboard at step 201 to enter initializing information to identify the label format, i.e.--the label of FIG. 5, as well as the initial value used for the indicia written on this label. The user at this step also inputs the final label value or the quantity of labels that are to be printed. It is assumed that there is a standard

correspondence between the alphanumeric characters printed on the label and the color background printed in the indicia fields. If the user wishes to vary this standard correspondence, data can be entered at step 201 to redefine the correspondence in processor 101-1. Assume for the purpose of this description that the standard format and color/numeric correspondence is desired. At step 202, the user defines the starting x and y position coordinates of the label generation on the sheet of label media.

Detailed Description Text - DETX (43): In response to the data entered by the user at steps 201 and 202, processor 101-1 retrieves the initial label value entered by the user and sets the label count variables equal to 1. Processing advances to step 204 where the label template is retrieved from the memory of processor 101-1. This label template consists of all of the standard invariant non-indicia printing on the label. The label template includes the vertical and horizontal print traps that function as delimiters to identify each indicia field on the label. The label template also includes the start and stop characters in the bar code. Any other invariant printing on the label is also drawn at this point. For the purpose of this description, the term "draw" indicates the generation of the control information required to activate one of printers 107-1 to 107-k to actually print the identified information on the label media. In the multi processing environment illustrated in FIG. 1, the entire sheet of label media is typically drawn at the same time rather than on a label by label basis as processor 101-1 generates the control signals. Thus, the control process illustrated in FIGS. 2 and 3 result in the generation of a data file that consists of all of the control information required to activate one of printers 107-1 to 107-k to produce an entire sheet or collection of sheets of labels. Thus, at step 204 when processor 101-1 "draws" the label template for the first label in the series of labels, processor 101-1 stores the data indicative of the template in a data file associated with this print job.

Detailed Description Text - DETX (45): At step 205, processor 101-1 retrieves the present value of the label indicia which, in this case, is the initial label value input by the user at step 201. At step 206, processor 101-1 converts the present label value into a set of optical character recognition (OCR) characters. These characters are drawn at step 207 in the appropriate indicia fields in the label template. At step 208, processor 101-1 obtains the correspondence between the generated OCR characters and the background colors required for each of the indicia fields in which these OCR characters are printed. At step 209, processor 101-1 generates the control signals to activate the printer to draw the colored area fills for each of the indicia fields in the label. At step 210, processor 101-1 retrieves the bar code values corresponding to the generated OCR characters. At step 211 these bar codes are drawn in appropriate indicia fields in the label template. This step completes the generation of a single label including the label template, the OCR characters, color background indicia and bar codes.

Detailed Description Text - DETX (47): Once the label is completed, processing advances to step 212 where processor 101-1 increments the label count, the horizontal position variable and the value of the label indicia. The label indicia can be numbered according to any predetermined ordering that is required by the user. This can be a sequential numbering, an ordered series, or correspondence to any input data file

provided by the user. Thus, label count and label indicia value record are maintained separately by processor 101-1 since the label numbering may not be sequential and may not match the label count. Processor 101-1 must increment the label count at step 212 and generate the next label indicia value according to whatever predetermined ordering has been identified by the user. At step 213, processor 101-1 increments the horizontal position variable. At step 214, processor 101-1 compares the horizontal position variable with the defined maximum number of horizontal print positions for the particular sheet of label media to be printed. Thus, in the example of FIG. 8, a matrix of N times M labels are to printed on the sheet of label media. For the purpose of illustration, the number of labels on a master block M.sub.1,1 of label media is five rows of twenty columns. Thus, at steps 213 and 214, the horizontal position count is incremented and compared with the delimiter of twenty to determine whether the entire row of twenty labels in the first block has been printed. If the entire row of twenty labels has not been printed, at step 214 processor 101-1 returns control to step 204 where another label in the sequence of labels is generated. The processing of steps 204 to 214 continues until an entire row of twenty labels has been printed. At this point, processing advances to step 215 where the vertical position count is incremented and at step 216 compared with the maximum value (which for this case is five). Thus, steps 213 and 214 generate a row of twenty labels while steps 215 and 216 generate five rows of twenty labels.

Detailed Description Text - DETX (48): Once processing of this master block M.sub.1,.sup.1 of 100 labels in a 20.times.5 matrix has been completed, processing advances to step 217 where the vertical position variable is reset to 1 and the horizontal block position is incremented. At step 218, the horizontal block position is compared with the maximum value which in this case is 2. Similarly, steps 219 and 220 reset the horizontal block position to 1, increment the vertical block position and compare it with a maximum value which in this case is 5. Thus, steps 213-220 generate a matrix consisting of a master block of 100 labels in a 20 wide by 5 high configuration which master block is replicated twice horizontally and five times vertically on a sheet of label media to produce a series of 1,000 labels. This series can be of arbitrary length but for the purpose of illustration is indicated here to be a length of 1,000 which is a typical number that would be used. Once the entire 1,000 labels are printed using the control routine illustrated in FIGS. 2 and 3, processing advances to step 221 where the generation process is completed.

Detailed Description Text - DETX (50): At this point, the entire data file consisting of the template and the label indicia information for all 1,000 labels is stored in processor 101-1. Since the series of labels is ready for printing, processor 101-1 transmits this data file to input/output processor 103 via bus 102-1 where the data file is stored until one of printers 107-1-107-k is available to print this data file. Assume for the purpose of discussion that printer 107-1 is available to print the data file. Input/output processor 103 transmits the data file over output bus 104-1 to raster processing machine 105-1 associated with printer 107-1. Raster processing machine 105-1 converts the data file that is downloaded from processor 101-1 via input/output processor 103 into a form and format that is usable by printer 107-1. Raster processing machine 105-1 converts the

object file form of the data file into ASCII raster data that is used to drive the print mechanism in printer 107-1. The type of control information that is provided in the object file are control signals indicative of which pen in the plotter is to produce a particular segment of the label, pen up and pen down commands, and data indicative of the starting position length and direction of each line or character printed on the label.

Detailed Description Text - DETX (52): The labels produced by the label generation apparatus (for example--FIG. 4) comprise an elongated rectangular shape base sheet member 102 (see FIG. 9) made of clear plastic material, such as Mylar, having a flat, smooth, glossy front surface 104 and a flat back surface 106 which has been chemically treated to enable electrostatic ink printing thereon as generally indicated by ink layer zone 108. The OCR alphanumeric characters 421-426 and corresponding colors 431-436 are reverse-printed with ink on the back surface 106 thereof in the printed ink zone 108 so as to be viewable in proper orientation through the front surface 104 thereof. Label graphics as they appear when viewed through front surface 104 are shown in FIG. 4, which is a front view of a back-printed plastic sheet. A layer of opaque adhesive material 110, FIG. 9, is fixedly adhered to the entire printed back surface 106 of the sheet member 102 in overlaying, covering relationship with the printed characters 421-426, and colors 431-436, thereon. Thus, unlinked portions (e.g. all of the spaces between the dark bars of the bar code alphanumeric characters in the second column 402 of FIG. 5) of the base sheet member material 102 appear to be the color of the opaque adhesive material 110 when viewed through the front surface 104 of base sheet member 102. The ink zone may have a single layer of ink, e.g. the black color bar code lines and the black color zone separating lines or multiple layers of ink where the black color alphanumeric indicia have a different color background overlay. A removable sheet 114 of backing material is removable adhered to the layer of opaque adhesive material 110, the backing material 114 being constructed of a substance such as treated paper which forms a weaker bond with the adhesive layer 110 than the plastic base member 102. Thus, the backing sheet is readily removable from the label prior to application of the label to a surface without removal of the adhesive layer 110 from the plastic layer 102.

Detailed Description Text - DETX (57): The composite web 196 initially passes through a scoring station 198 in which scoring blades 200, shown schematically in FIG. 10, provide a plurality of cuts 202. The knife 200 illustrated in FIG. 10 is shown raised above cut 202, but it will, of course, be understood that, during an actual cutting operation, the knife would be positioned within the area indicated by the cut 202. The cut 202 extends through the clear plastic layer 102 and adhesive layer 110, terminating at the interface 111 between the adhesive layer 110 and backing layer 114. A scored web 210, as shown in FIG. 10 including the areas shown in solid lines and in phantom lines, thus emerges from scoring station 198. A scrap web stripping means which may include a scrap windup spool 212 and an idler roll 213 is provided for stripping a continuous scrap web 214 from the scored web 210 to provide a stripped label stock web 216, as shown in FIG. 10 in solid lines only. The continuous scrap web 214, FIG. 10 in phantom, comprises the portions of plastic layer 102 and adhesive layer 100 other than the portions thereof associated with label graphics and none of the backing layer

114. The stripped label stock web 216 includes all of the continuous backing layer 114, the portion of plastic layer 102 which was back-printed with label graphics, and the portion of adhesive layer 110 directly underlying the portion of layer 102 with graphics printed thereon. The stripped label stock web 216 thus formed passes through a slitting station 218 whereat a plurality of slitting knives 220, FIG. 12, longitudinally slit the stripped label stock web 216 to from a slit label stock web 222 comprising a plurality of longitudinally-extending strips 224, 226, 228, 230, 232, etc., defined by cuts 217, which are each one label wide. The slit label stock web 222 is collected on a slit web windup spool 240, FIG. 11, and thus provides a plurality of rolls of label strip stock 224, 226, etc.

Detailed Description Text - DETX (60): Within the template generator 111 described above, is included control software to enable a user to create label formats and to produce labels with variable templates. Thus, the series of labels can include subsets of labels where each subset consists of a plurality of labels, each label in a subset having at least one different template field but identical indicia, such that each label in the subset contains identical indicia that are printed in varying format or configuration; or can be aggregated into subsets, where each subset consists of a plurality of labels, each label in a subset having at least one different template field and varying indicia such that each label in the subset contains different indicia and some of the indicia are printed in varying format or configuration.

Detailed Description Text - DETX (61): One example of such capability is illustrated in FIGS. 13 and 14 wherein FIG. 13 represents a database of employee information and FIG. 14 is a typical variable template label generation program in flow diagram form. The database includes typical relevant employee data and whenever an employee is added to the payroll, a plurality of employee labels need be produced: payroll file, department file, medical file. The label for each of these files can be customized to match the specific needs of that application and the labels can include indicia that are automatically produced by indicia generator 112 and indicia that are input via the database illustrated in FIG. 13. The individual label templates are produced by a user and stored in memory in template generator 111 for access by the label generation programs such as that illustrated in FIG. 14.

Detailed Description Text - DETX (63): The Label Generator Application is a "point and click" application which allows a user to design, build, and generate a label from the available tools. The user can take a design concept, build a block-wire diagram of the label and generate a basic label configuration. Since every label design is different, there is no set way to build a label. However, there are certain guidelines and procedures involved in the label generation process which are outlined here.

Detailed Description Text - DETX (64): The Label Generator Application (LGA) is actually a two phase process. The first phase is a graphical design process which generates a label configuration file (LCF). The second phase of the application takes the label configuration file and processes the information to generate an actual hardcopy label. All of the label generator application functionality is controlled from the

applications main screen illustrated in FIG. 15. This main screen is split into four general areas:

Detailed Description Text - DETX (67): 3) Graphic Design Area--1503

Detailed Description Text - DETX (69): Initially, the Label/File Functions Area 1501 and the Status Area 1502 are active. The Label/File Function Area 1501 allows the user to perform general actions on the label configuration files. The Status Area 1502 is always active but there is no direct user interface with this area, since this area reports general error messages. When the Label/File Function Area 1501 is inactive, the Graphic Design Area 1503 and the Create/Edit Options Area 1504 are active. The Graphics Design Area 1503 is the graphical area where the block-wire diagram of the current label design is presented. The Create/Edit Options Area 1504 is where the user selects the objects and their associated parameters used to build the label.

Detailed Description Text - DETX (71): 1) Create Label

Detailed Description Text - DETX (81): 1) Create Label--The "Create Text" and "Select Template Size" functions are directly associated with "Create Label" and these three functions are grouped together in a functional manner. The Create Label function must be preceded by both the Create Text function and the Select Template Size function in order to initiate the proper Create Label parameters.

Detailed Description Text - DETX (82): a) Create Text--This function is intended for the user to create the desired text format of the data file for the current label design. When the Create Text function is selected, a filename pop-up is activated. The user inputs the desired name of the data file and then a template for the data format is displayed. The user then inputs the actual data desired for the present label configuration as well as the maximum string length for the desired format (maximum string length defaults to the string length of the current text string).

Detailed Description Text - DETX (83): b) Select Template Size--This function allows the user to either choose the desired label template size from a current table or add a previously undefined template size to the table and select it. This template is the initial building block for all label designs.

Detailed Description Text - DETX (84): Once the Create Text and Select Template Size functions have been completed, a label may be created. When the Create Label function is chosen, the filename pop-up is activated and the user inputs the name of the label configuration file to be created. When this name is "entered" the Label File Function Area 1501 is temporarily disabled (except the Display Text File function) while the Graphics Design Area 1503 is activated, showing a ruled wire image of the current template, and all of the options in the Create/Edit Options Area 1504 are activated (FIG. 16).

Detailed Description Text - DETX (91): The Objects function allows the user to choose the object type to be placed on the label, solicits the necessary information for the object type, and enables that object to be placed in the Graphical Design Area 1503. The other four functions are used to either address the contents of the label configuration file or define certain aspects of the current object.

Detailed Description Text - DETX (94): Once all of the necessary information for an entity is gathered, the user can place the entity on the template in the Graphic Design Area 1503 at the desired position simply by moving the cursor to the desired coordinates and "clicking" the proper mouse button. An entity may be deleted simply by choosing the Delete Action and then pointing to the desired entity to be deleted with the cursor and "clicking".

Detailed Description Text - DETX (95): 2) Copy Label--The Copy Label function allows a user to copy an existing label configuration file in order to create a modified version of that configuration. When selected, a pop-up is activated which prompts the user for the name of the source label configuration file (From:) and the target label configuration file (To:).

Detailed Description Text - DETX (96): 3) Edit Label--The Edit Label function allows a user to edit an existing label configuration file. When selected, a filename pop-up is activated and the user inputs the name of the desired label configuration file. When "entered", the configuration for that label appears in the Graphics Design Area 1503. The Label/File Function Area 1501 is temporarily disabled and the Create/Edit Options Area 1504 is activated. From here, the user has all of the options just as if the Create Label function was chosen.

Detailed Description Text - DETX (97): 4) View Label--The View Label function allows the user to view an existing label configuration file. When selected, a filename pop-up is activated and the user inputs the name of the desired label configuration file When "entered" the configuration for the label appears in the Graphics Design Area 1503 but there is no user interaction (i.e. no functional change to active areas and editing is not allowed).

Detailed Description Text - DETX (99): 6) Create Text--See Create Label above.

Detailed Description Text - DETX (100): 7) Select Template Size--See Create Label above.

Detailed Description Text - DETX (103): Label and Template Merging

Detailed Description Text - DETX (104): The labels defined by a user, as described above, are populated with indicia according to the operational steps of a label routine as illustrated for example in FIG. 14. Again using the employee database example, at step 1401 the user activates the label routine by accessing the routine via user interface 114. The routine at step 1402 queries the user for input data, such as: employee name, social

security number, date of birth, department number, pay grade, number and types of labels. At step 1403, indicia generator 112 automatically generates an ordered sequence of indicia, such as employee number, date of hire. Once the indicia are generated, the defined sequence of labels is created by combining at step 1404 the user input indicia and automatically generated indicia into each label in the subset of labels. The routine at step 1405 uses the input data that defines the number and types of labels to generate a template for each label. The templates include both fixed and variable template fields, which are typically defined by the user identifying existing label types that are stored in memory. This example notes three labels: payroll file, department file, medical file--illustrated in FIGS. 17-19, respectively. Thus, the payroll file label 1700 of FIG. 17 notes employee name 1701, employee number 1702 and social security number 1703 in alphanumeric form, and in bar code form 1704 as well as year of hire in both alphanumeric 1705 and color code form 1706. In order to simplify file identification, a color band 1707 indicative of type of file can be included. The department file label 1800 of FIG. 18 lists employee name 1801, and employee number 1802 in alphanumeric form and in bar code form 1805 while pay grade 1803 and year of hire 1804 are illustrated by color codes on the label. Finally, FIG. 19 represents the medical file label 1900 which again lists employee name 1901, employee number 1902 but also year of birth 1903 and department 1908 in alphanumeric form and in bar code form 1904 while year of birth 1905 and department 1906 are displayed in color code form and bar code form 1907. These labels are produced by combining at step 1406 the generated indicia, user input indicia and generated fixed and variable template fields. The resultant label data is transmitted at step 1407 to the printer apparatus 170, as described above.

Detailed Description Text - DETX (105): Thus, a subset of labels, each a unique combination of indicia and templates, are automatically produced as part of a series of labels. Each subset is, in this example, keyed on a single data entry or event (new employee). It is obvious that various combinations and variations of this arrangement are possible. Bar codes, alphanumeric indicia, color codes, magnetic codes can be used as well as label formats whose configurations are only limited by the imagination of the user who creates the templates.

Claims Text - CLTX (1): 1. Apparatus for automatically producing a set of labels, said set consisting of a plurality of labels, all of which uniquely identify a single entity, each label in said set of labels containing a combination of indicia and template fields that is individual to said label, comprising:

Claims Text - CLTX (2): means for defining a set of label templates, said set of label templates consisting of a plurality of label templates, each label template having at least one writable indicia field;

Claims Text - CLTX (4): means for automatically aggregating a subset of indicia from said generated single set of indicia for each of said label templates, each said subset of indicia including at least one indicia that uniquely identifies said single entity;

Claims Text - CLTX (5): means for automatically generating data representative of each of said plurality of templates and a corresponding subset of indicia, said data defining said set of labels;

Claims Text - CLTX (6): means, responsive to said means for automatically generating, for producing said set of labels; means for color coding at least one of said excerpted indicia according to a predetermined color to indicia correspondence; and

Claims Text - CLTX (11): means for generating label media registration marks.

Claims Text - CLTX (17): means responsive to said producing means for converting said label template data and said inserted indicia into printing control signals defining individually identified labels.

Claims Text - CLTX (21): computer controlled printing apparatus for converting said printing control signals to printed indicia and template on said label media.

Claims Text - CLTX (24): 10. A method for automatically producing a set of labels, said set consisting of a plurality of labels, all of which uniquely identify a single entity, each label in said set of labels containing a combination of indicia and template fields that is individual to said label, comprising the steps of:

Claims Text - CLTX (25): defining a set of label templates, said set of label templates consisting of a plurality of label templates, each label template having at least one writable indicia field;

Claims Text - CLTX (27): automatically aggregating a subset of indicia from said generated single set of indicia for each of said label templates, each said subset of indicia including at least one indicia that uniquely identifies said single entity;

Claims Text - CLTX (28): automatically generating data representative each of said label templates and a corresponding subset of indicia, said data defining said set of labels;

Claims Text - CLTX (29): automatically producing, in response to said data generated, said set of labels;

Claims Text - CLTX (35): generating label media registration marks.

Claims Text - CLTX (41): converting said label template data and inserted indicia into printing control signals defining individually identified labels.

Claims Text - CLTX (45): converting, in a computer controlled printing apparatus, said printing control signals to printed indicia and template on said label media.

Claims Text - CLTX (49): means for defining a sheet template consisting of a matrix of n*m label templates, said matrix of label templates consisting of a plurality of label templates with each of said templates containing at least one writable indicia field and at least one variable template field, wherein n is a positive integer greater than 0 and m is a positive integer greater than 1;

Claims Text - CLTX (50): means for automatically generating indicia for each of said indicia fields on each of said labels in said matrix of label templates according to a user defined label identification ordering to individually identify each label;

Claims Text - CLTX (51): means for automatically generating a set of data representative of said at least one variable template field for each label in said series of labels according to a predetermined label ordering;

Claims Text - CLTX (52): means for combining said sheet template and said generated indicia and data to produce a definition of a series of individually identified labels;

Claims Text - CLTX (55): means for printing said defined series of labels on label media.

Claims Text - CLTX (65): means for generating label media registration marks.

Claims Text - CLTX (71): means responsive to said inserting means for converting said label template data and said inserted indicia into printing control signals defining individually identified labels.

Claims Text - CLTX (75): computer controlled printing apparatus for converting said printing control signals to printed indicia and template on said label media.

Claims Text - CLTX (79): defining a sheet template consisting of a matrix of n*m label templates, said matrix of label templates consisting of a plurality of label templates with each of said templates each containing at least one writable indicia field and at least one variable template field, wherein n is a positive integer greater than 0 and m is a positive integer greater than 1;

Claims Text - CLTX (80): automatically generating indicia for each of said indicia fields on each of said labels in said matrix according to a user defined label identification ordering to individually identify each label;

Claims Text - CLTX (81): automatically generating a set of data representative of said at least one variable template field for each label in said series of labels according to a predetermined label ordering;

Claims Text - CLTX (82): combining said sheet template and said generated indicia and data to produce a definition of a series of individually identified labels;

Claims Text - CLTX (85): printing said defined series of labels on label media.

Claims Text - CLTX (95): generating label media registration marks.

Claims Text - CLTX (101): converting said label template data and inserted indicia into printing control signals defining individually identified labels.

Claims Text - CLTX (105): converting, in a computer controlled printing apparatus, said printing control signals to printed indicia and template on said label media.

Claims Text - CLTX (108): 43. Apparatus for automatically producing a sequence of individually identified labels, said set consisting of a plurality of labels, all of which uniquely identify a single entity, each label in said set of labels containing a combination of indicia and template fields that is individual to said label, comprising:

Claims Text - CLTX (109): means for defining a label set template comprising an n*m pattern of individual label templates, each of which includes k writable information fields and at least one variable template field;

Claims Text - CLTX (111): means for inserting data representative of said variable template field into said defined label template for each label in said series of labels according to a predetermined label ordering; and

Claims Text - CLTX (112): means for inserting the k characters of each successive one of said n*m indicia in the corresponding writable information fields of successive individual label templates.

Claims Text - CLTX (118): defining a label set template comprising an n*m pattern of individual label templates, each of which includes k writable information fields and at least one variable template field, where n and k are positive integers greater than 0 and m is a positive integer greater than 1;

Claims Text - CLTX (120): inserting data representative of said variable template field into said defined label template for each label in said series of labels according to a predetermined label ordering; and

Claims Text - CLTX (121): inserting the k characters of each successive one of said n*m indicia in the corresponding writable information fields of successive individual label templates.

Claims Text - CLTX (128): means for defining a set of label templates, said set of label templates consisting of a plurality of label templates, each label template having at least one writable indicia field;

Claims Text - CLTX (130): means for inserting data representative of a one of said at least one indicia into each said defined label template for each label in said series of

labels according to a predetermined label ordering; means for combining said label template and said generated indicia;

Claims Text - CLTX (132): printer apparatus for printing labels on a label medium;

Claims Text - CLTX (136): defining a set of label templates, said set of label templates consisting of a plurality of label templates, each label template having at least having at least one writable indicia field;

Claims Text - CLTX (138): inserting data representative of a one of said at least one indicia into each said defined label template for each label in said series of labels according to a predetermined label ordering;

Claims Text - CLTX (139): combining said label template and said generated indicia;

Claims Text - CLTX (146): means for storing m sets of data, each of said m sets of data defining a label template having at least one writable indicia field, where m is a positive integer greater than 1.

Claims Text - CLTX (148): means, responsive to said generating means and said m sets of data, for producing m individually identified labels for each of said n sets of indicia received from said generating means.

Claims Text - CLTX (150): means for automatically printing said individually identified label on to label media.

Claims Text - CLTX (153): means for automatically printing each of said individually identified labels in said set of labels on to label media.

Claims Text - CLTX (157): storing m sets of data, each of said m sets of data defining a label template having at least one writable indicia field, where m is a positive integer greater than 1.

Claims Text - CLTX (161): automatically printing said individually identified label on to label media.

Claims Text - CLTX (164): automatically printing each of said individually identified labels in said set of labels on to label media.

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TITLE: System and method for preparing custom designs for multiple types of imprintable media
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ABSTRACT: A system for creating and ordering custom designed imprintable media. The system includes a one or more first computers coupled to a central computer. The first computers are configured and arranged to input a type indicating one of a plurality of imprintable media, custom design information to engrave on an imprintable medium of the type input, and order information, and to display an image of the custom design to appear on the imprintable medium. Example custom design information includes text, clip-art, and size and shape of the imprintable medium. Custom designs and orders are automatically transmitted to a second computer for order processing.
16 Claims, 27 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 25

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Drawing Description Text - DRTX (20): FIG. 18 is an image of an example user interface screen for modification of line positions in address text of a customized address stamp;

Detailed Description Text - DETX (3): FIG. 1 is a functional block diagram of an example environment in which the present invention can be used. The environment includes a plurality of kiosks 102a, 102b, 102c, . . . 102n coupled to a communications network 104. A central computer system 106 is also coupled to network 104. The kiosks 102a-n provide stations having a user interface for consumers to create custom designs for stamps, signs and name plates, labels, and calling cards. The term "imprintable medium" is used in the description to refer to stamps, signs and name plates, labels, and calling cards. Even though each of the aforementioned media are not imprintable as the term imprintable is commonly used, the media are referred to as such as a matter of convenience. The term "imprintable media" as used herein is intended to also encompass products that are engraved with custom designs, such as rubber stamps, in addition to products having custom printed designs, such as labels.

Detailed Description Text - DETX (10): Processing continues at step 304 where kiosk computer 204 reads user input of size and shape specifications (represented as size and

shape codes, for example) for the imprintable medium. This allows the consumer to custom design the size and shape of the imprintable medium. At step 306, kiosk computer 204 reads user input of clip-art selections (for example, as referenced by image codes). Kiosk computer 204 presents images in clip-art files 212 on computer monitor 208 for selection by the user. At step 308, kiosk computer 204 reads user input of text (represented as text codes for example to engrave on the imprintable medium. In reading the text, kiosk computer 204 automatically aligns and sizes the text to correspond to the input shape and size specified by the user. Thus, the user does not have to determine by trial and error an appropriate size and alignment for the input text relative to the selected type, size, and shape of imprintable medium. After the text has been automatically aligned and sized by kiosk computer 204 at step 310, the user may select different formatting to apply to the text, such as underlining, boldness, line positions, and types of fonts. User input of text format parameters are read by kiosk computer 204 at step 310. Kiosk computer 204 reads user input of color selections, at step 312, to apply to the imprintable medium. Example color selections include, but are not limited to, a color for a rubber stamp, foreground and background colors for signs and name plates, foreground and background colors for labels, and colors for images and text on calling cards. At step 314, kiosk computer 204 displays an image of the custom design of the imprintable medium. While shown only as a single step for displaying an image, it should be understood that kiosk computer 204 displays the image of the custom design as it is being developed, for example, after selection of a size and shape after step 304, after selection of a clip-art image at step 306, and after selection of colors at step 308.

Detailed Description Text - DETX (25): FIG. 15 is an image of an example user interface screen for selecting further customization options for an address stamp. In screen 892, the user may select changes to type styles and sizes, line positions, colors of text or clip-art, and boldness, italics, and underlining of the address text. A different user interface screen is presented to the user depending upon which of buttons 894, 896, 898 or 900 the user touches. If the user touches button 894, a user interface screen for changing type styles and sizes is presented; if the user touches button 896, a user interface screen for changing line positions is displayed,; if the user touches button 898, a user interface screen for changing colors of type or clip-art is displayed, and if the user touches button 900, a user interface screen for adding boldness, italics, or underlining is displayed for the user. The following FIGS. illustrate screen images for each of the aforementioned customization options.

Detailed Description Text - DETX (28): FIG. 18 is an image of an example user interface screen for modification of line positions in address text of a customized address stamp. Screen 942 solicits the user for specification of line numbers of the address text to be changed and the line position at which the specified lines are to be placed. Line number buttons 944a-h are available for the user to specify which lines of the address text are to be changed. To affect changes to individual ones of the lines of the address text, the user must touch the appropriate line number buttons 944a-g. To apply the desired changes to all the lines of the address text, line number button 944h must be touched. After the user has selected the lines, the user must select the desired

line position. To select a line position, the user must touch one of line position buttons 946a-c. Line position button 946a must be touched for left alignment of the address text; line position button 946b must be touched for centering the address text; and line position button 946c must be touched for right alignment of the address text. After the positions of the lines have been selected, the user must touch next button 848 to continue with customization of the address stamp. The next customization option is for selecting colors for the address stamp as shown in FIG. 19.

Detailed Description Text - DETX (35): Continuing now with FIG. 24, a user interface screen 1032 is shown for positioning clip-art within the custom stamp. The user may select any one of seven positions as illustrated by touch boxes 1034a-g. Kiosk computer 204 updates the image in box 1036 after the user has selected the desired position (as represented by a position code). After the user is satisfied with the desired position of the clip-art in the custom stamp, the user touches next button 848 to continue with creating the custom stamp. In response, kiosk computer 204 displays an example user interface screen for entering text for the custom stamp.